

DL. XXVII. — No. 12.

DECEMBER 1950.

Monthly  
**Bulletin**  
of the International  
**Railway Congress Association**  
(English Edition)

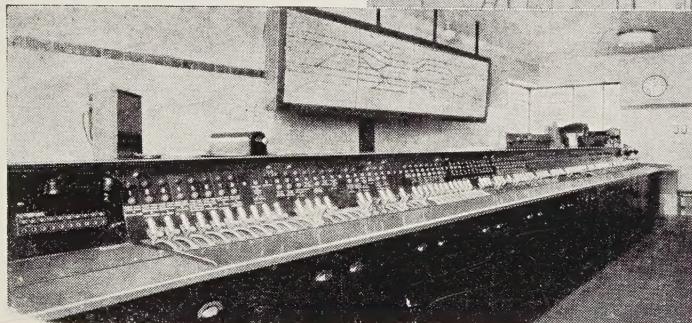
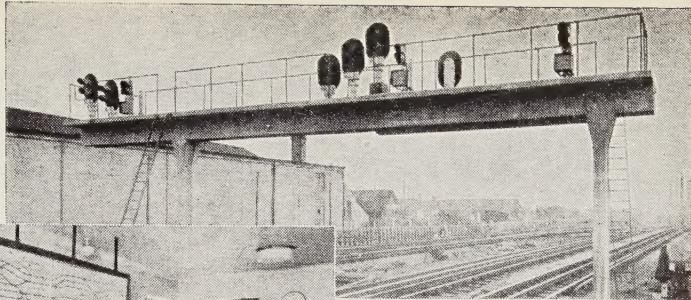


This issue contains the summary of the proceedings of the Congress held in Rome in September-October 1950 by the International Railway Congress Association.



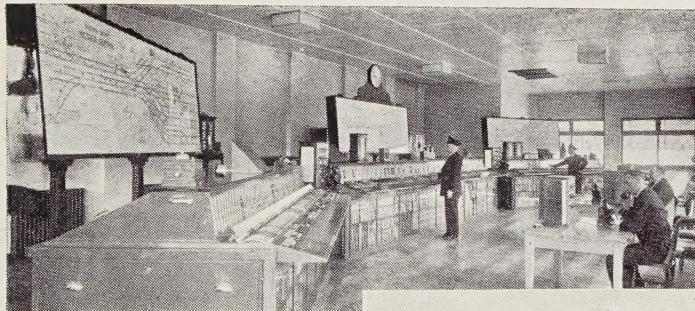
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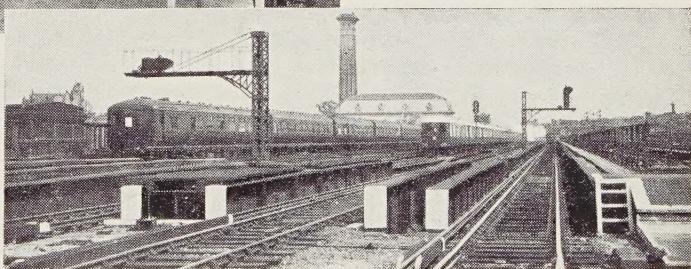
On London's Underground Railways, Westinghouse Signal equipment has been extensively installed since the first trial installation in 1903.

Photos by courtesy of London Transport Executive.



Many years of efficient service can be credited to the Westinghouse Signal equipment which is installed on the extensive electrified passenger lines of the Southern Region, British Railways. These include the large and busy terminal stations of Waterloo, Victoria, London Bridge, etc.

Photos by courtesy of British Railways (Southern Region)



**Two outstanding examples  
of the co-operation of**

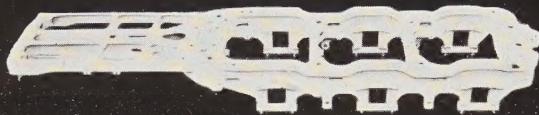
**WESTINGHOUSE**

**SIGNALLING**

in the maintenance of some of the most intensive electric services in the world

**WESTINGHOUSE BRAKE & SIGNAL CO. LTD.  
82 YORK WAY, KING'S CROSS, LONDON, N. 1.**

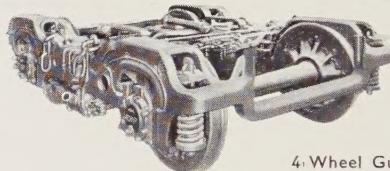
# CHILEAN STATE RAILWAYS Again Selects COMMONWEALTH TRUCK BEDS for New Electric Locomotives



Cast Steel Driving  
Truck Bed—Front Unit



Cast Steel Driving  
Truck Bed—Rear Unit



4-Wheel Guiding Truck  
with Cast Steel Frame

Because of their successful experience with COMMONWEALTH beds for more than 25 years, this progressive South American railroad selected COMMONWEALTH One-Piece Cast Steel Driving Truck Beds and Guiding Trucks for four large modern electric locomotives recently built in anticipation of the planned extension of electrification to their Southern lines. The locomotives were supplied by the General Electric Company and the Westinghouse Electric Corporation who installed the electrical equipment, consisting of motors and controls. The mechanical portions of the locomotives were built by Baldwin Locomotive Works.

COMMONWEALTH Cast Steel Driving Truck Beds—front and rear units—and COMMONWEALTH Guiding Trucks combine many structural and design features, eliminating many separate assembled parts.

On electric locomotives, as on other types of power, COMMONWEALTH PRODUCTS provide maximum strength with minimum weight, and substantial savings in maintenance costs.

*Electric locomotives with COMMONWEALTH beds are in service on many railroads of North America, including the New Haven, the New York Central, the Pennsylvania, the Great Northern, and others.*



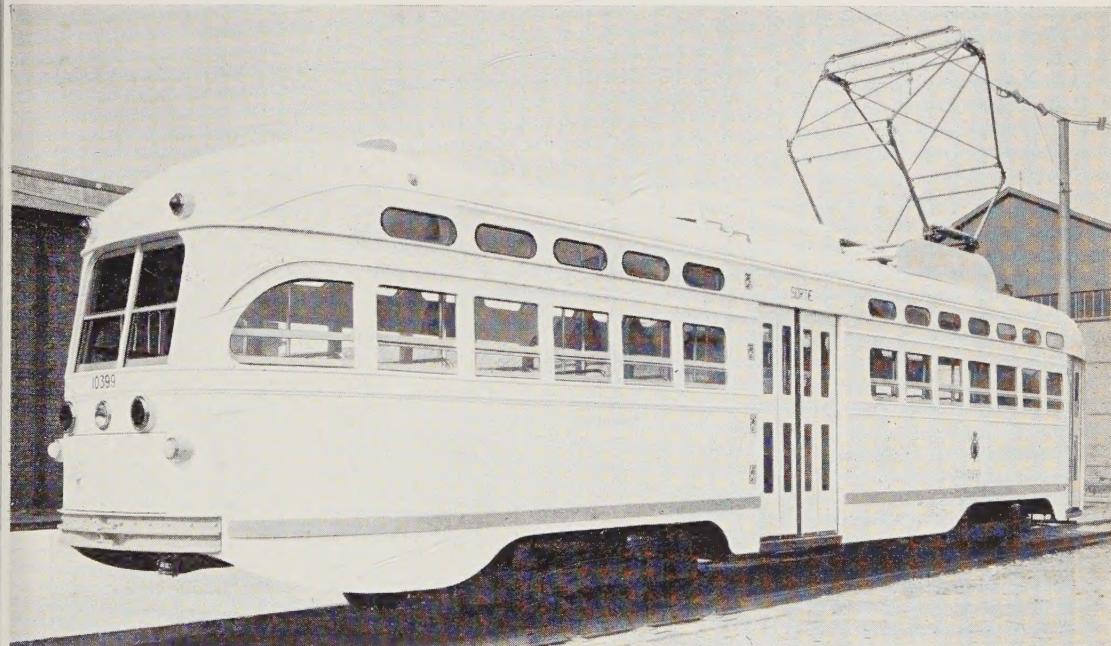
**COMMONWEALTH PRODUCTS** Are Manufactured By  
**GENERAL STEEL CASTINGS**, Granite City, Ill., Eddystone, Pa., U. S. A.

**COMMONWEALTH SALES CORPORATION**  
**Export Sales Agents, Eddystone, Pa., U. S. A.**

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STEEL CONSTRUCTIONS RIVETED AND WELDED



WHEEL SETS — STEEL CASTINGS — IRON FOUNDRY  
SPRINGS

ATHERMOS

IN THE WORLD

MORE THAN

625.000

AXLEBOXES WITH MECHANICAL LUBRICATION

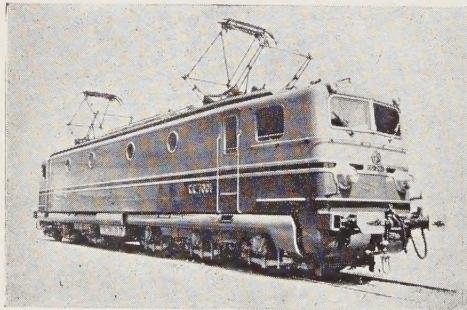
**« ISOTHERMOS SYSTEM »**

ARE IN SERVICE

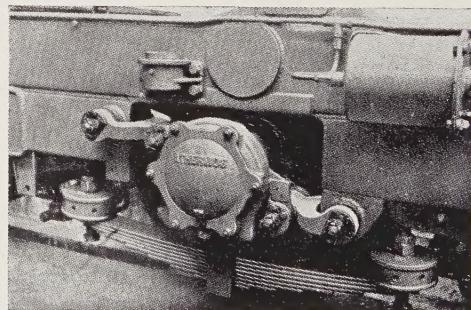
(Electric and Diesel-electric locomotives, tenders, coaches, wagons, etc.)

Saving  
Safety

Easiness of fitting and maintenance



S. N. C. F. electric locomotive C. C. n° 7001  
equipped with « ATHERMOS » type axleboxes  
(ISOTHERMOS latest model)



S. N. C. F. electric locomotive C. C. n° 7001  
Details of the suspension

**Sociétés Générales Isothermos**

35, rue de la Tour d'Auvergne, PARIS (9<sup>e</sup>)

9, rue du Moniteur, BRUSSELS

**Société Internationale des Applications Isothermos**

60, avenue de la Grande Armée, PARIS (17<sup>e</sup>)

# 'ENGLISH ELECTRIC'

## DIESEL-ELECTRIC LOCOMOTIVES

**IN MALAYA**

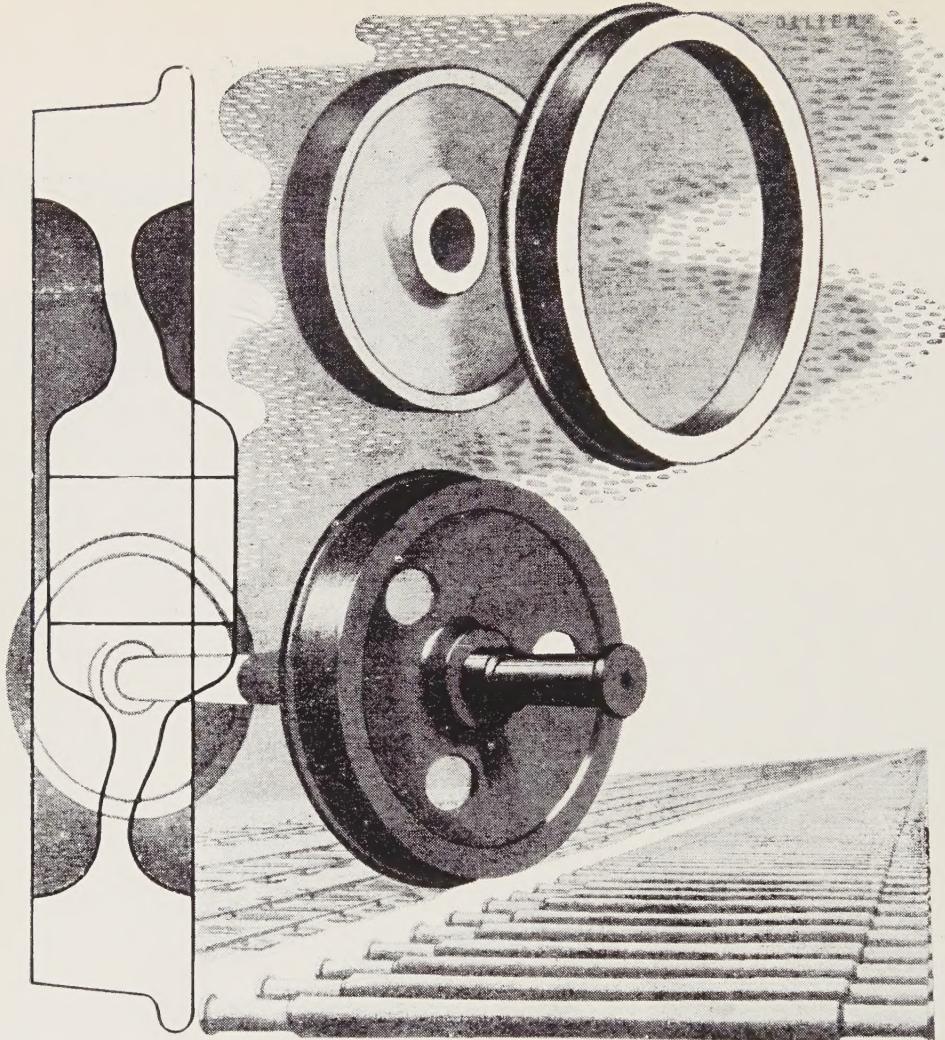


One of twenty 350-h.p. metre-gauge  
'English Electric' Diesel-Electric  
shunting locomotives supplied to  
the Malayan Railway.

'English Electric' shunting locomotives  
have been proved in service  
on British Railways and in  
four continents



The ENGLISH ELECTRIC Company Ltd.  
**TRACTION DEPARTMENT — — — BRADFORD**  
Works: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL



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At the Workington plant high duty wear-resisting Bessemer acid steel rails are made, together with fishplates, bearing plates and steel sleepers.

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WORKINGTON IRON & STEEL COMPANY · WORKINGTON**

Branches of The United Steel Companies Limited of Sheffield, England

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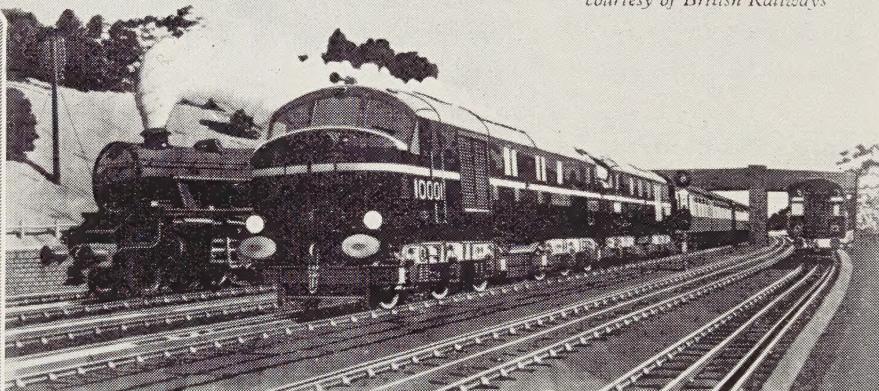
22, rue de l'Arcade

PARIS 8<sup>e</sup>

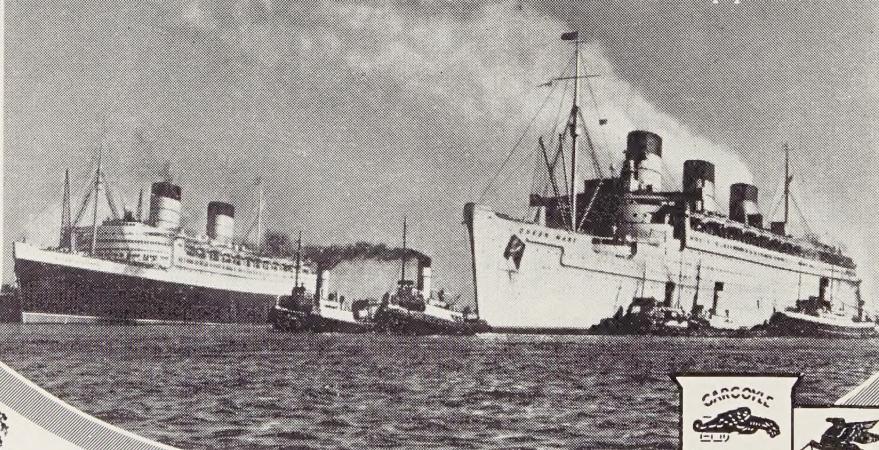
# Ashore and Afloat

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courtesy of British Railways*



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# VACUUM OIL COMPANY LIMITED

LONDON, S.W.I

# Bulletin of the International Railway Congress Association

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## CONTENTS OF THE NUMBER FOR DECEMBER 1950.

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**1950** **385. (06 .112**

Bull. of the Int. Ry. Congress Ass., No. 12, December.

Summary of the proceedings of the fifteenth Session  
(Rome, 1950) of the International Railway Congress  
Association. (196 pages, 2 photos and tables.)

**LIBRARY**  
OF THE  
**Permanent Commission of the International Railway Congress Association**

READING ROOM : 19, rue du Beau-Site, Brussels.

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Works in connection with railway matters, which are presented to the Permanent Commission are mentioned in the « Bulletin ». They are filed and placed in the library. If the Executive Committee deems it advisable they are made the subject of a special notice. Books and publications placed in the reading room may be consulted by any person in possession of an introduction delivered by a member of the Association. Books, etc., may not be taken away except by special permission of the Executive Committee.

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The Permanent Commission of the Association is not responsible for the opinions expressed in the articles published in the Bulletin.

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An edition in French is also published.

**BULLETIN**  
 OF THE  
**INTERNATIONAL RAILWAY CONGRESS**  
**ASSOCIATION**  
 (ENGLISH EDITION)

[ 385. (06 .112) ]

**FIFTEENTH SESSION**

ROME, SEPTEMBER 25th to OCTOBER 4th, 1950

**SUMMARY OF PROCEEDINGS**

**SUMMARY**

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# List of the papers published.

Number of the question	TITLE OF THE QUESTION	DOCUMENTS	Year, month and page of the English <i>Bulletin</i>	Number of the separate issue
<b>1st Section. — Way and Works.</b>				
I	Modern tendencies in the building of railway structures, especially bridges. Results obtained in the construction of railway bridges in reinforced concrete. Future prospects of the pre-stressed concrete.	Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by A. Dean.	March 1950, p. 259.	6
		Report (Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by L. Marguerat.	August 1950, p. 1657.	35
		Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by G. Polsoni.	September 1950, p. 1887.	38
II	Rail-joints: improvements in fishplated joints. Use of long welded rails: optimum length in relation to the safety and good condition of the permanent way. Expansion gaps. Determination of standard allowances.	Report (Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by O. Ledue.	February 1950, p. 127.	2
		Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by B. Renda.	March 1950, p. 167.	3
		Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by P. Croom-Johnson.	March 1950, p. 207.	—
		Supplement to Report by O. Ledue.	September 1950, p. 2001.	—
III	New technical methods adopted for the design and construction of large marshalling yards. Lay-out and equipment: site and importance of siding groups; lay-out of connections at entrance to groups; longitudinal and cross sections; braking installations (Retarders); control of point (switch) operation; telecommunications; lighting; staff buildings, etc.	Report (Denmark, France and Colonies, Italy, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by Marchand.	April 1950, p. 363.	8
		Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by J. Van Rijn.	April 1950, p. 431.	10
		Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by J. I. Campbell and J. W. Watkins.	April 1950, p. 483.	12

Number of the question	TITLE OF THE QUESTION	DOCUMENTS	Year, month and page of the English Bulletin	Number of the separate issue
<b>2nd Section. — Locomotives and rolling stock.</b>				
IV	The comfort of passengers in coaches, railcars and electric motor coaches: sound proofing; lighting; heating, air conditioning, ventilation, thermic isolation; upholstery; running stability (type of bogie and suspension).	Report (Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by O. G. Weberg. Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by E. F. Loquet.	May 1950, p. 931.	20
V	Improvements in the construction of rolling stock (motor and trailer) in view of increasing the mileage between repairs: solid wheels or with tyres (metal used for the tyres and solid wheels, behaviour in service); axle boxes; wearing and friction metals; springs (qualities, shape, manufacture).	Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by M. Martinelli. Supplement to Report by O. Weberg.	July 1950, p. 1597.	33
VI	Comparative study of the different types of transmission between motors and axles of electric locomotives, electric motor coaches and Diesel-electric railcars. Effect on the track of the types of bogies and systems of motor suspension.	Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by E. Pugson and L. Lynes. Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by A. d'Arbelo and M. Fasoli. Report (Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by G. Chan.	September 1950, p. 1861.	37
VII	Organizing methods to be used in large marshalling yards and terminals, to reduce to the minimum the cost per wagon shunted. Determination of the staff and number of shunting engines needed. Capacity and control of the efficiency of the marshalling yards. Recording and number-taking arrangements in the arrival and departure yards. Statistics and traffic analysis by the control-room. Braking and retarding arrangements. The formation of trains for departure.	Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by W. S. Graff-Baker. Report (Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Turkey and Yugoslavia), by J. Tapia. Report (Austria, Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Sweden, Switzerland and Syria), by Ch. Hoffet.	April 1950, p. 543 and June 1950, p. 1145. July 1950, p. 1529. August 1950, p. 1755.	14 30 36 13 32 34
<b>3rd Section. — Working.</b>				
		Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by E. W. Rostern.	April 1950, p. 409.	9
		Report (Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by Lamarque.	June 1950, p. 1093.	23
		Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by M. Cirillo.	June 1950, p. 1227.	25

Number of the question	TITLE OF THE QUESTION	DOCUMENTS	Year, month and page of the English Bulletin	Number of the separate issue
VIII	In view of the ever increasing weight of road competition, what are the most appropriate measures, apart from reduced rates, for keeping traffic by full wagon loads in the hands of the railway? Would not road transport at the end of the railway journey be justified in order to get direct contact with clients who are not connected up by railway sidings? Should not the road vehicles required to assure such transport be attached to central stations, equipped with suitable handling equipment, from which the road transport services would start? Choice of the vehicles to be used.	Report (Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by Girette Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by A. A. Harrison. Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by Mario Dias Trigo.	April 1950, p. 325. May 1950, p. 775. May 1950, p. 809.	7 15 16
IX	Modern safety and signal installations (centralising apparatus for block system and signals). Central electric apparatus with individual levers and "all relay" levers (all electric interlocking). Automatic block-system with continuous current and coded current. Light and speed signalling.	Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by H. H. Dyer. Report (Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by E. J. F. Derijckere (1). Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by R. Righi.	March 1950, p. 247. July 1950, p. 849. June 1950, p. 1389.	5 18 28
X	Drawing up the financial balances regarding passenger and goods services taking into account the prime cost of trains : per category, per line and per type of motive power. Principles and methods of calculation.	Report (America (North and South), Burma, China, Denmark, Egypt, Finland, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States, Norway, Pakistan and Sweden), by A. Sjoberg. Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, France and Colonies, Greece, Hungary, Italy, Luxembourg, Netherlands and Colonies, Poland, Portugal and Colonies, Rumania, Spain, Switzerland, Syria and Yugoslavia), by R. Dugas.	April 1950, p. 447. June 1950, p. 1217.	11 24
XI	Organisation and development of medical and social services with partnership of the staff in their management.	Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by P. H. Sarma. Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, Denmark, Finland, France and Colonies, Greece, Hungary, Italy, Luxembourg, Netherlands and Colonies, Norway, Poland, Portugal and Colonies, Rumania, Spain, Sweden, Switzerland, Syria, Turkey and Yugoslavia), by Dr. Huyberechts.	May 1950, p. 841. June 1950, p. 1255.	17 26

(1) The translation of this report, which first appeared in the *Bulletin* for May, 1950 (p. 849), was cancelled and the final text is published at the end of the *Bulletin* for July, 1950 (p. 849).

Number of the question	TITLE OF THE QUESTION	DOCUMENTS	Year, month and page of the English Bulletin	Number of the separate issue
XII	What must the importance and the prevailing conditions of traffic be, in order that from the economic point of view: a) the construction of a railway line; b) the keeping operating an existing railway line, should be useful?	Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by Sven Boye.  Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, Denmark, Finland, France and Colonies, Greece, Hungary, Italy, Luxemburg, Netherlands and Colonies, Norway, Poland, Portugal and Colonies, Rumania, Spain, Sweden, Switzerland, Syria and Yugoslavia), by N. Laloni.  Supplement to Report by Sven Boye.	February 1950, p. 111.  June 1950, p. 1371.  July 1950, p. 1471.	1  27  —
XIII	Modernisation of the maintenance methods of the permanent way on the light railways.	Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, Denmark, Finland, France and Overseas Territories, Greece, Hungary, Italy, Luxemburg, Netherlands and Colonies, Norway, Poland, Portugal and Colonies, Rumania, Spain, Sweden, Switzerland, Syria, Turkey and Yugoslavia), by L. Ripert.	May 1950, p. 877.	19
XIV	Change over from steam-locomotive traction to Diesel traction.	Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by J. R. Farquharson.	May 1950, p. 1069.	22
XV	Signalling on single track lines.	Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by A. W. Olivier.  Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, Denmark, Finland, France and Colonies, Greece, Hungary, Italy, Luxemburg, Netherlands and Colonies, Norway, Poland, Portugal and Colonies, Rumania, Spain, Sweden, Switzerland, Syria, Turkey and Yugoslavia), by M. Diegoli.	June 1950, p. 1419.  September 1950, p. 1927.	29  39
		Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by H. W. Jackson.	May 1950, p. 1047.	21
		Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, Denmark, Finland, France and Overseas Territories, Greece, Hungary, Italy, Luxemburg, Netherlands and Colonies, Norway, Poland, Portugal and Colonies, Rumania, Spain, Sweden, Switzerland, Syria, Turkey and Yugoslavia), by W. A. Vrielynck and P. Thomas.	July 1950, p. 1487.	31

# PROGRAMME OF EVENTS

## Monday, September 25th.

*Morning, 9 a.m.* — Registration of the Delegates.

*9.30 a.m.* — Meeting of the Permanent Commission.

*12 noon.* — Reception at the Capitol for the Delegates.

*Afternoon, 4.30 p.m.* — Opening Ceremony of the Session, under the presidency of H. Ex. On. Lodovico d'ARAGONA, Minister of Transport, Italy.

## Tuesday, September 26th.

*Morning, 9 a.m.* — Sectional Meetings.

*Afternoon.* — Technical visits and excursions (\*).

## Wednesday, September 27th.

*Morning, 9 a.m.* — Sectional Meetings.

*Afternoon.* — Technical visits and excursions (\*).

(\*) Objects of the afternoon *Technical visits* on September 26th, 27th and 29th, and October 4th :

1. *Terni Company's Works.* Foundry and Steel-works at Terni.
  2. *Hydro-electric power station of « Galletto »,* near Terni.
  3. *« Pirelli » Works,* near Tivoli, tyres and rubber articles factory.
  4. *« Prenestina » electric sub-station* of the Italian State Railways.
  5. *Central apparatus installation* at Rome Termini Station.  
Particulars about these visits are given on pages 2425 of this *Bulletin*.
- Afternoon trips* on September 26th, 27th and 29th, and October 4th :
1. *Tour to « Castelli Romani ».* — Via Appia Antica, Albano, Genzano, Nemi, Via dei Laghi, Marino, Frascati, Monte Cavo.
  2. *Ostia.* — Visit of the old town of Ostia and the Lido.
  3. *Tivoli.* — Visit of Villa d'Este and Adriana.
  4. *Anzio and Nettuno.* — Visit of the battle-fields and of the towns of Anzio and Nettuno.
  5. *Tour of Rome.*

## Thursday, September 28th.

*Morning, 9 a.m.* — Sectional Meetings.

*Evening.* — Official dinner given by the Italian State Railways.

## Friday, September 29th.

*Morning, 9.30 a.m.* — Plenary Meeting.

*Afternoon.* — Technical visits and excursions (\*).

## Saturday, September 30th and Sunday, October 1st.

Excursions to the Gulf of Naples or to Florence offered by the Italian State Railways.

## Monday, October 2nd.

*Morning, 9.00 a.m.* — Sectional Meetings.

*Afternoon.* — Free.

*Evening.* — Gala performance at the Opera House.

## Tuesday, October 3rd.

*Morning, 9.00 a.m.* Sectional Meetings.

*Afternoon.* — Reception by the Pope Pius XII in his summer residence at Castelgandolfo.

## Wednesday, October 4th.

*Morning, 9.30 a.m.* — Plenary Meeting.

*11.30 a.m.* — Closing Meeting of the Session under the presidency of Mr. G. di RAIMONDO.

*12 noon.* — Meeting of the Permanent Commission.

*Afternoon.* — Technical visits and excursions (\*).

## Thursday, October 5th.

Departure for the excursions of several days.

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*Note.* — For particulars of the excursions, please see pages 2427/2427 of this *Bulletin*.

# List of the participating Administrations and adherent organisations.

(Position on 1st September 1950.)

ADMINISTRATIONS	Kilo-metres	ADMINISTRATIONS	Kilo-metres
<b>GERMANY (Western).</b>		<b>BRAZIL.</b>	
Deutsche Bundesbahn . . . . .	30 354	Compagnie des Chemins de fer de l'Est brésilien . . . . .	2 293
		Chemin de fer de Rio Grande do Sul.	3 591
<b>ARGENTINE.</b>		<b>BULGARIA.</b>	
Chemins de fer de l'Etat . . . . .	40 820	Chemins de fer de l'Etat . . . . .	3 051
<b>AUSTRIA.</b>		<b>CHINA.</b>	
Chemins de fer Fédéraux Autrichiens.	6 025	Chinese Government Railways . . . . .	7 183
<b>BELGIUM AND COLONY.</b>		<b>DENMARK.</b>	
a) Belgium :		Chemins de fer de l'Etat . . . . .	2 540
Société Nationale des Chemins de fer belges . . . . .	5 026	Chemin de fer privé d'Aalborg . . . . .	257
Société Nationale des Chemins de fer vicinaux . . . . .	4 782	Chemin de fer de l'Est de Seeland . . . . .	47
Compagnie Générale d'Entreprises électriques et industrielles « Electobel »	38	Chemin de fer de Lolland-Falster . . . . .	104
Railways économiques de Liège-Seraing et extensions . . . . .	21		
Compagnie belge de Chemins de fer et d'Entreprises . . . . .	188	<b>EGYPT.</b>	
b) Colony :		Chemins de fer de l'Etat . . . . .	4 492
Chemins de fer du Bas-Congo au Katanga . . . . .	2 468	The Egyptian Delta Light Railways . . . . .	977
Chemins de fer du Congo Supérieur aux Grands Lacs Africains . . . . .	849		
Chemins de fer Vicinaux au Congo . . . . .	839	<b>SPAIN.</b>	
Office d'Exploitation des Transports Coloniaux (OTRACO) . . . . .	600	Red Nacional de los Ferrocarriles Españolets (R. E. N. F. E.) . . . . .	12 775
		Compagnie Générale des Chemins de fer Catalans . . . . .	201
<b>BURMA.</b>		<b>UNITED STATES OF AMERICA.</b>	
Burma Railways . . . . .	2 859	Delaware and Hudson Railroad Corporation . . . . .	1 274
		Long Island Railroad . . . . .	634

ADMINISTRATIONS	Kilo-metres	ADMINISTRATIONS	Kilo-metres
<b>FINLAND.</b>		<b>GREAT BRITAIN AND BRITISH COMMONWEALTH.</b>	
Chemins de fer de l'Etat . . . . .	4 713	a) <i>Great Britain :</i>	
<b>FRANCE, ALGERIA AND TUNISIA, COLONIES AND PROTECTORATES.</b>		British Railways (The Railway Executive) London Transport Executive . . . . .	31 950 316
a) <i>France :</i>		b) <i>Dominions, Protectorates and Colonies:</i>	
Société Nationale des Chemins de fer français . . . . .	41 305	<b>Africa.</b>	
Chemins de fer Départementaux . . . . .	1 644	East African Railways and Harbours . . . . .	4 717
Société Générale des Chemins de fer Economiques . . . . .	3 340	Nigerian Railways . . . . .	3 062
Chemins de fer Economiques du Nord . . . . .	119	South African Railways and Harbours . . . . .	21 454
Régie Autonome des Transports Partisans . . . . .	186	Sudan Railways . . . . .	3 242
Chemins de fer Secondaires du Nord-Est . . . . .	254	Rhodesia Railways . . . . .	4 022
Compagnie Générale de Voies ferrées d'intérêt local . . . . .	441	<b>Asia.</b>	
b) <i>Algeria and Tunisia :</i>		Ceylon Government Railway . . . . .	1 438
Chemins de fer Algériens . . . . .	4 340	Malayan Railways . . . . .	1 384
Chemin de fer de Gafsa . . . . .	453	<b>Australia.</b>	
Compagnie fermière des Chemins de fer Tunisiens . . . . .	1 610	Victorian Railways . . . . .	7 654
c) <i>Colonies and Protectorates :</i>		<b>New Zealand.</b>	
<b>Africa.</b>		New Zealand Government Railways . . . . .	5 677
Chemins de fer de l'Afrique Equatoriale française et du Cameroun . . . . .	1 014	<b>GREECE.</b>	
Chemins de fer coloniaux de l'Afrique occidentale française et Togo . . . . .	4 216	Chemins de fer de l'Etat . . . . .	830
Chemin de fer franco-éthiopien de Djibouti à Addis-Abeba . . . . .	783	Chemin de fer Pirée-Athènes-Péloponèse . . . . .	815
Chemins de fer de Madagascar . . . . .	859	Chemins de fer de Thessalie . . . . .	233
Chemins de fer du Maroc . . . . .	1 091	<b>HUNGARY.</b>	
Chemins de fer de la Réunion . . . . .	127	Chemins de fer de l'Etat hongrois . . . . .	7 764
Chemin de fer de la Méditerranée au Niger . . . . .	275	<b>INDIA.</b>	
<b>Asia.</b>		The Railway Board . . . . .	44 324
Chemins de fer coloniaux de l'Indochine . . . . .	1 168	<b>INDONESIA.</b>	
Compagnie française des Chemins de fer de l'Indochine et du Yunnan . . . . .	100	Chemins de fer de l'Etat aux Indes néerlandaises . . . . .	4 350

ADMINISTRATIONS	Kilo-metres	ADMINISTRATIONS	Kilo-metres
<b>IRAN.</b>		<b>PORUGAL AND COLONIES.</b>	
Chemins de fer Iraniens . . . . .	1 823	a) <i>Portugal</i> :	
		Compagnie des Chemins de fer Portugais	3 535
<b>IRAQ.</b>		b) <i>Colonies</i> :	
Iraq Railways . . . . .	1 554	Chemins de fer de l'Etat . . . . .	2 322
		Chemin de fer du Benguela . . . . .	1 347
<b>IRELAND.</b>		<b>RUMANIA.</b>	
Coras Iompair Eireann . . . . .	3 218	Chemins de fer Roumains . . . . .	9 767
<b>ITALY.</b>		<b>SWEDEN.</b>	
Chemins de fer de l'Etat . . . . .	17 177	Chemins de fer de l'Etat . . . . .	14 794
Chemins de fer de la Méditerranée . . .	845	Chemin de fer Nora-Bergslagen . . .	173
Société Nationale de Chemins de fer et de Tramways . . . . .	175	Chemin de fer Nordmarks-Klarelfvens .	171
Chemins de fer du Nord de Milan . . .	243	Chemin de fer Oxelösund-Flen-Västmanlands . . . . .	300
Chemins de fer Complémentaires de la Sardaigne . . . . .	697	Chemin de fer Stockholm-Roslag . . .	238
Ferrovie del Sud-Est . . . . .	475	<b>SWITZERLAND.</b>	
S. A. Torinese Tranvie Intercomunali . .	41	Chemins de fer fédéraux . . . . .	2 899
Société Vénitienne pour la Construction et l'Exploitation de Chemins de fer secondaires en Italie . . . . .	376	Chemins de fer des Alpes bernoises (Berne-Loetschberg-Simplon) . . .	253
Compania delle Ferrovie Danubio-Sava-Adriatico . . . . .	310	Chemin de fer Rhétique . . . . .	391
Tramways électriques de Brescia . . . .	97	Chemin de fer de Viège à Zermatt . .	44
Azienda Tranvierie Municipale Milano. .	371	Chemin de fer d'Yverdon à Sainte-Croix . .	25
		Chemins de fer Fribourgeois . . . . .	100
		Chemin de fer Emmental-Burgdorf-Thun . .	170
<b>LUXEMBURG.</b>		<b>SYRIA.</b>	
Chemins de fer Luxembourgeois . . . . .	542	Chemins de fer de l'Etat Syrien . . . . .	248
		Chemin de fer de Damas-Hama et prolongements . . . . .	583
<b>NORWAY.</b>		<b>CZECHOSLOVAKIA.</b>	
Chemins de fer de l'Etat . . . . .	4 392	Chemins de fer de l'Etat . . . . .	13 196
<b>NETHERLANDS.</b>			
Chemins de fer Néerlandais, S. A. . . .	3 355		
<b>POLAND.</b>			
Chemins de fer de l'Etat . . . . .	15 131		

ADMINISTRATIONS	Kilo-metres	ADMINISTRATIONS	Kilo-metres
TURKEY. Chemins de fer et Ports de l'Etat turc . . . . .	7 110	YUGOSLAVIA. Chemins de fer de la République Populaire Fédérative de Yougoslavie . .	9 461

#### AFFILIATED ORGANISATIONS

Association of American Railroads.

Compagnie Auxiliaire Internationale de Chemins de fer.

Compagnie Internationale des Wagons-Lits et des Grands Express Européens.

Federazione Nazionale Imprese Trasporti.

Office Central des Transports Internationaux par Chemin de fer.

Union des Voies Ferrées et des Transports Automobiles.

Union Internationale des Chemins de fer.

Union des Chemins de fer Privés Suédois (Svenska Järnvägsföreningen).

# GENERAL LIST OF DELEGATES

Note. — An asterisk(\*) means that a delegate is already a member of the Congress in some other capacity, latter being inserted in brackets.

◆ = Present in Rome.

## I. — Delegates of the Permanent Commission.

### A. — PERMANENT COMMISSION.

President :

F. H. Delory, directeur général de la Société Nationale Chemins de fer belges.

Vice-presidents :

J. M. Goursat, directeur de la Région du Nord de la Société Nationale des Chemins de fer français; P. Ghilain, directeur du Service du Matériel et des Chats de la Société Nationale des Chemins de fer belges.

Members of the Executive Committee :

Dorges, inspecteur général des Ponts et Chaussées, secrétaire général aux Travaux publics, directeur général des Chemins de fer et des Transports au Ministère des Travaux publics et des Transports de France; Lord Hurcomb, Chairman of the British Transport Commission; Sir Gilmour Jenkins, Secretary to Minister of Transport (Grande-Bretagne).

Ex-Presidents of Session, ex-officio members :

S. E. Ibrahim Fahmy Kerim Pacha, Le Caire; Dr W. Meile, ancien président de la Direction générale des Chemins de fer fédéraux suisses.

Members :

S. E. Abdel Rahman el Sayed Ammar Bey, sous-secrétaire d'Etat au Ministère des Communications d'Egypte;

Armand, directeur général de la Société Nationale des Chemins de fer français;

Ch. Badhwar, Member, Railway Board, Ministry of Railways, Government of India;

J. M. Barrington-Ward, member of the Railway Executive (British Railways);

Miles Beevor, Chief secretary and legal adviser to the British Transport Commission;

Besnard, chef du service adjoint au directeur général des Chemins de fer et des Transports, Ministère des Travaux publics et des Transports (France);

David Blee, member of the Railway Executive (British Railways);

Boucqué, directeur du Service de la Voie de la Société Nationale des Chemins de fer belges;

Boutet, inspecteur général des Ponts et Chaussées, vice-président du Conseil général des Ponts et Chaussées (France);

◆ R. Claudon, inspecteur général des Ponts et Chaussées, vice-président du Conseil d'administration de la Société Nationale des Chemins de fer français;

M. W. Clement, Chairman of the Board, Pennsylvania Railroad Company (U. S. A.);

◆ Dr R. Cottier, directeur de l'Office Central des Transports Internationaux par Chemins de fer;

◆ T. C. Courtney, Chairman of the Coras Iompair Eireann (Ireland);

Csanadi, Directeur Général des Chemins de fer de l'État Hongrois.

◆ R. da Costa Couvreur, ancien président du Conseil supérieur des Travaux publics au Ministère des Travaux publics et des Communications du Portugal;

Dargeou, directeur du Service central de Mouvement de la Société Nationale des Chemins de fer français;

J. de Aguinaga, directeur général adjoint du Réseau National des Chemins de fer espagnols;

◆ F. Q. den Hollander, président des Chemins de fer néerlandais;

◆ Ing. V. Desic, professeur à la Faculté technique de Belgrade, Conseiller permanent du Ministère des Chemins de fer (Yougoslavie);

◆ M. Devos, directeur général de la Société Nationale belge des Chemins de fer vicinaux;

◆ Ing. G. di Raimondo, directeur général des Chemins de fer de l'Etat italien;

S. E. Aly Zaki El Oraby Pacha, Ministre des Communications d'Egypte;

W. T. Farici, président, Association of American Railroads;

S. E. Khadr Gabr Bey, directeur général adjoint de l'Administration des Chemins de fer, Télégraphes et Téléphones de l'Etat égyptien;

Ing. Mayer Grümberg, directeur général des Chemins de fer roumains;

◆ Ranald J. Harvey, consulting engineer to the Government of New Zealand (Railways);

◆ Dr Huyberechts, directeur général adjoint de la Société Nationale des Chemins de fer belges;

Ing. Ch. Kalitzov, chef de la Section du mouvement des Chemins de fer et des Ports de l'Etat bulgare;

A. Kriz, ingénieur, conseiller supérieur de Section au Ministère des Communications de la République tchécoslovaque;

◆ Dr N. Laloni, chef du Service Commercial et du Trafic des Chemins de fer de l'Etat italien;

- ◆ M. Lemaire, directeur à la Société Nationale des Chemins de fer français;
- ◆ R. Lévi, directeur, chef du Service technique des Installations fixes de la Société Nationale des Chemins de fer français;
- ◆ C. Lucchini, président de la Direction générale des Chemins de fer fédéraux suisses;

Ing. R. Luna, directeur général des Chemins de fer de l'Etat argentin;

W. H. W. Maass, advisory engineer to the High Commissioner for the Union of South Africa.

- ◆ M. Malderez, secrétaire général du Ministère des Communications de Belgique;

A. Marguerat, administrateur des Compagnies de Chemins de fer de Viège à Zermatt, Furka-Oberalp, Gornergrat et Schöllenens (Suisse);

- ◆ Ing. F. Marin, vice-directeur général des Chemins de fer de l'Etat italien;

Ing. P. P. Martin, directeur national de la Planification et de la Coordination du Ministère des Transports de la République d'Argentine;

Sir Eustace Missenden, Chairman of the Railway Executive (British Railways);

Sir Alan Mount, consultant to the Railway Executive (British Railways);

- ◆ P. Nolet de Brauwere, Secrétaire Général de la Société Nationale des Chemins de fer belges;

J. H. Nuelle, président, Delaware and Hudson Railroad Corporation (Etats-Unis d'Amérique);

G. Olivier, directeur général adjoint de la Société Nationale des Chemins de fer belges;

- ◆ G. Pader, secrétaire général honoraire de l'Union Internationale des Chemins de fer, conseiller technique attaché à la Présidence du Comité de gérance de l'U. I. C.

R. A. Riddles, member of the Railway Executive (British Railways);

- ◆ J. M. Rivero de Aguilar, directeur général du Réseau National des Chemins de fer espagnols;

◆ F. Steiner, Directeur de l'Office fédéral des transports de la Confédération suisse;

- ◆ E. D. F. Terkelsen, directeur général des Chemins de fer de l'Etat danois;

◆ J. C. L. Train, member of the Railway Executive (British Railways);

- ◆ E. G. J. Upmark, directeur général des Chemins de fer de l'Etat suédois;

◆ J. Vanderborght, directeur du Service de l'Exploitation de la Société Nationale des Chemins de fer belges;

Th. M. B. van Marle, inspecteur-généraal van het Verkeer, Rijksverkeersinspectie (Pays-Bas);

Ing. Ugo Vallecchi, Directeur général de l'Inspecteur général de la Motorisation civile et des Transports concédés, Ministère des Transports (Italie);

- ◆ F. Perez Villamil, sous-directeur général du Réseau National des Chemins de fer espagnols;

Wagner, ingénieur en chef au Ministère des Communications de Pologne;

- ◆ S. E. le Dr Sayed Abdel Wahid Bey, directeur général de l'Administration des Chemins de fer, Télégraphes et Téléphones de l'Etat égyptien;

Dr C. C. Wang, representative of Chinese Ministry of Communications;

R. B. White, president, Baltimore and Ohio Railroad Company.

#### Honorary Member :

- ◆ U. Lamalle, directeur général honoraire de la Société Nationale des Chemins de fer belges, professeur cours de chemins de fer à l'Université de Louvain;

#### General secretary :

- ◆ P. Ghilain (\*).

#### Assistant secretaries :

- ◆ J. Dubus, ingénieur en chef attaché à la Direction générale de la Société Nationale des Chemins de fer belges;

- ◆ Uytborck, ingénieur à la Société Nationale des Chemins de fer belges.

#### Chief of the Secretariat :

- ◆ J. Dumont.

### B. — ITALIAN LOCAL ORGANISING COMMISSION.

#### a) HONORARY COMMITTEE :

##### President :

- ◆ On. Lodovico d'Aragona, Ministre des Transports d'Italie.

##### Vice-presidents :

- ◆ On. Avv. Bernardo Mattarella, Député au Parlement, Sous-Secrétaire d'Etat aux Transports;

- ◆ On. Ing. Emilio Battista, Sénateur de la République, Sous-Secrétaire d'Etat aux Transports.

##### Members :

- On. Prof. Edoardo Angelo Martino, Député au Parlement, Sous-Secrétaire d'Etat à la Présidence du Conseil des Ministres;

- On. Dott. Giulio Andreotti, Député au Parlement, Sous-Secrétaire d'Etat à la Présidence du Conseil des Ministres;

- ◆ On. Avv. Teodoro Bubbio, Sénateur de la République, Sous-Secrétaire d'Etat à l'Intérieur;

- ◆ On. Avv. Giuseppe Brusasca, Député au Parlement, Sous-Secrétaire d'Etat aux Affaires étrangères;

- On. Prof. Francesco Maria Dominello, Député au Parlement, Sous-Secrétaire d'Etat aux Affaires étrangères;

- ◆ On. Dr Vinicio Ziino, Sénateur de la République, Sous-Secrétaire d'Etat à l'Industrie et Commerce.

- On. Ing. Ludovico Camangi, Député au Parlement, Sous-Secrétaire d'Etat aux Travaux publics;

- ◆ On. Avv. Enrico Malintoppi, Sénateur de la République, Sous-Secrétaire d'Etat à la Défense prévue à l'Aviation civile;

- ◆ On. Avv. Fernando Tambroni, Député au Parlement, Sous-Secrétaire d'Etat à la Marine marchande;

On. Avv. Carlo **Vischia**, Sénateur de la République, us-Secrétaire d'Etat à l'Instruction publique;  
 On. Avv. Virginio **Bertinelli**, Député au Parlement, us-Secrétaire d'Etat à l'Instruction publique;  
 On. Prof. Vito Giuseppe **Galati**, Député au Parlement, Sous-Secrétaire d'Etat à la Poste et aux Télécommunications;  
 On. Pietro **Romani**, Commissaire pour le Tourisme.  
 Dr Ing. Giovanni di **Raimondo**, Directeur Général des Chemins de fer de l'Etat italien (membre de la Commission Permanente);  
 Dr Ing. Prof. Marco **Visentini**, Président du Conseil supérieur des Travaux publics;  
 Dr Mario **Trinchero**, Préfet de Rome;  
 Prof. Ing. Salvatore **Rebecchini**, Maire de Rome;  
 Prof. Dott. Giuseppe **Cardinali**, Recteur Magnifique l'Université de Rome;  
 Dott. Angelo **Costa**, Président de la Confédération générale de l'Industrie italienne;  
 Dr Ing. Prof. Filippo **Neri**, Directeur de l'Ecole des Ingénieurs de Rome.

#### b) EXECUTIVE COMMITTEE :

##### *President :*

Dr Ing. G. di **Raimondo**, directeur général des Chemins de fer de l'Etat italien (membre de la Commission Permanente et du *Comité d'Honneur*);

##### *Vice-presidents :*

Dr Ing. F. **Marin**, vice-directeur général des Chemins de fer de l'Etat italien (membre de la Commission Permanente);  
 Dr Ing. Ettore **Lo Cigno**, vice-directeur général des Chemins de fer de l'Etat italien

##### *Members :*

Prof. Ing. U. **Bajocchi**, président du Collège des Ingénieurs Ferroviaires italiens;

Dr Ing. Cleto **Biondi**, chef du Service du Mouvement des Chemins de fer de l'Etat italien;

Dr Ing. Gino **Bracci**, chef du Service des Approvisionnements des Chemins de fer de l'Etat italien;

Dr Ing. Giovanni **Caliendo**, chef du Service financier des Chemins de fer de l'Etat italien;

Dr Ing. Michele **Cappuccio**, inspecteur général supérieur de la Motorisation Civile et des Transports en concession;

Sigfrido **Ciccotti**, chef du Bureau de Presse du Cabinet du Ministre des Transports;

Dr Ing. Amedeo **Cuttica**, chef du Service du Matériel de la Traction des Chemins de fer de l'Etat italien;

Dr Ing. Mario **De Dominicis**, conseiller de la Commission de Rome, proposé au « Servizi Tecnologici ed alle Aziende Municipalizzate »;

Cav. del lavoro Adelmo **Della Casa**, président de la Fédération des Associations italiennes des Hôtels du Tourisme.

S. E. le Prince Dr Ing. Don Enzo di **Napoli Ramella**, secrétaire technique de la Commission Centrale pour l'Année Sainte;

- ◆ Dr Ing. Mario **Eula**, chef du Compartiment de Rome, Chemins de fer de l'Etat italien;
- ◆ Dr Ing. F. **Fazio**, chef de service au Service de la Voie (électricité et signalisation);

Dr Ing. Umberto **Grazzi**, directeur général des Affaires économiques au Ministère des Affaires étrangères;

- ◆ Dr Prof. Nicola **Laloni**, chef du Service Commercial et du Trafic des Chemins de fer de l'Etat italien;
- ◆ Dr Ing. Giorgio **Lasz**, chef du Service du Personnel et des Affaires Générales des Chemins de fer de l'Etat italien;

Rag. Enrico **Linzi**, directeur général de la Compagnie italienne de Tourisme;

S. E. le Prince Dr Don Francesco **Massimo Lan-cellotti**, président du Syndicat provincial pour le Tourisme de Rome;

- ◆ Dr Ing. Antonio **Mene**, directeur compartimental de Rome de la Motorisation Civile et des Transports en concession;

Dr Giuseppe **Mosti**, directeur général de la Navigation et du Trafic Maritime;

- ◆ Dr Ing. Lino **Omenti**, chef du Service de la Voie et des Constructions des Chemins de fer de l'Etat italien;

◆ Dr Ing. Vito **Perrone**, inspecteur général supérieur de la Motorisation Civile et des Transports en concession;

- ◆ Prof. Dante **Poli**, représentant en Italie de la Compagnie Internationale des Wagons-Lits;

◆ Dr Ing. Giovanni **Robert**, directeur de la Revue *Ingegneria Ferroviaria*;

Marquis Francesco Maria **Taliani del Marchio**, ambassadeur d'Italie, chef du Service du Cérémonial au Ministère des Affaires étrangères;

- ◆ Dr Ing. Ivo **Vanzi**, président de la Fédération Nationale des Entreprises de Transports.

##### *Secretary :*

◆ Dr Ing. Mario **Valdivieso**, inspecteur en chef au Service du Personnel et des Affaires générales des Chemins de fer de l'Etat italien.

##### *Assistant-secretaries :*

- ◆ Dr Giuseppe **Santoni Rugiu**, inspecteur en chef du Service Commercial et du Trafic, Chemins de fer de l'Etat italien;

◆ Avocat Aldo **Morganti**, inspecteur en chef de la Motorisation Civile et des Transports en concession;

- ◆ Luigi **Broglio**, inspecteur principal au Service du Personnel et des Affaires Générales, Chemins de fer de l'Etat italien.

#### C. — REPORTERS ON THE QUESTIONS SUBMITTED TO THE CONGRESS.

- ◆ Sven **Boye**, inspecteur principal des Chemins de fer de l'Etat norvégien;

◆ J. I. **Campbell**, civil engineer, Eastern Region, British Railways;

- ◆ Ing. U. **Cantutti**, inspecteur en chef supérieur au Service du Matériel et de la Traction des Chemins de fer de l'Etat italien;

- ◆ G. Chan, ingénieur en chef au Service Technique du Matériel et de la Traction de la Société Nationale des Chemins de fer français;
- ◆ Dr Ing. M. Cirillo, inspecteur en chef supérieur au Service du Mouvement des Chemins de fer de l'Etat italien;
- ◆ P. Croom-Johnson, chief engineer, London Transport Executive;
- ◆ Dr Ing. A. d'Arbela, inspecteur en chef supérieur au Service du Matériel et de la Traction des Chemins de fer de l'Etat italien;
- A. Dean, chief officer, Engineering (Works), The Railway Executive; British Railways;
- ◆ E. J. F. Derijkere, directeur de l'Electricité et de la Signalisation de la Société Nationale des Chemins de fer belges;
- Mario Dias Trigo, ingénieur en chef de la Répartition d'Exploitation et Statistique à la Direction Générale des Chemins de fer au Ministère des Communications (Portugal);
- ◆ Dr Ing. M. Diegoli, inspecteur en chef au Service du Matériel et de la Traction des Chemins de fer de l'Etat italien;
- ◆ R. Dugas, directeur, chef du Service Technique de la Direction Générale de la Société Nationale des Chemins de fer français;
- ◆ H. H. Dyer, chief executive officer, Engineering (Signals and Telecommunications), The Railway Executive; British Railways;
- ◆ J. R. Farquharson, chief engineer, East African Railways and Harbours;
- ◆ Dr Ing. M. Fasoli, inspecteur en chef au Service du Matériel et de la Traction des Chemins de fer de l'Etat italien;
- ◆ Girette, chef du service de l'Exploitation de la Région Sud-Ouest de la Société Nationale des Chemins de fer français;
- ◆ W. S. Graff-Baker, chief mechanical engineer (Railways); London Transport Executive;
- ◆ A. A. Harrison, executive officer (Road Transport), British Railways;
- ◆ Ch. Hoffet, chef de section à la Division de la Traction et des Ateliers de la Direction Générale des Chemins de fer fédéraux suisses;
- ◆ Dr Huyberechts (\*), directeur général adjoint de la Société Nationale des Chemins de fer belges (membre de la Commission Permanente);
- ◆ A. Huys, inspecteur en chef à la Direction du Personnel et des Services Sociaux, de la Société Nationale des Chemins de fer belges;
- ◆ H. W. Jackson, chief signal engineer, South African Railways and Harbours;
- ◆ Dr Prof. Nicola Laloni (\*), chef du Service Commercial et du Trafic des Chemins de fer de l'Etat italien (membre de la Commission Permanente);
- ◆ Lamarque, ingénieur en chef à la Région du Nord de la Société Nationale des Chemins de fer français;
- ◆ O. Leduc, ingénieur en chef au Service Technique des Installations fixes de la Société Nationale des Chemins de fer français;
- ◆ E. F. Loquet, ingénieur à la Société Nationale des Chemins de fer belges;
- ◆ L. Lynes, technical Assistant to Carriage and Wagon Engineer, The Railway Executive, British Railways;

- ◆ Marchand, ingénieur en chef au Service Central Mouvement de la Société Nationale des Chemins fer français;
- ◆ L. Marguerat, chef de la Section des Ponts à la Direction Générale des Chemins de fer fédéraux suisses;
- ◆ P. Marois, directeur du Service Commercial de Société Nationale des Chemins de fer français;
- ◆ Dr Ing. M. Martinelli, ingénieur, inspecteur en chef au Service du Matériel et de la Traction des Chemins de fer de l'Etat italien;
- ◆ A. W. Olivier, ingénieur en chef au Service de la Traction des Chemins de fer néerlandais;
- ◆ Dr Ing. Prof. G. Polsoni, inspecteur en chef supérieur au Service des Travaux et des Constructions de la Direction Générale des Chemins de fer de l'Etat italien;
- ◆ E. Pugson, chief officer (Carriage and Wagon Construction and Maintenance), The Railway Executive; British Railways;
- ◆ Dr Ing. B. Renda, Chef du Service de la Voie des Chemins de fer de l'Etat italien;
- ◆ Dr Ing. R. Righi, inspecteur en chef supérieur au Service des Travaux et des Constructions de la Direction Générale des Chemins de fer de l'Etat italien;
- ◆ L. Ripert, ingénieur en chef du Service de la Voie et des Travaux de la Société Générale des Chemins de fer Economiques (France);
- ◆ E. W. Rostern, operating superintendent, Eastern and North Eastern Regions, The Railway Executive; British Railways;
- P. H. Sarma, director of Wagon Interchange and General Secretary of the Indian Railway Conference Association;
- ◆ Arne Sjöberg, Chief Research Economist, Swedish State Railways;
- ◆ J. Tapia, ingénieur en chef au Service de la Tractoélectricité de la Red Nacional de los Ferrocarriles Espanoles;
- ◆ P. Thomas, ingénieur au Service de la Tractio du Matériel de la Société Nationale des Chemins de fer vicinaux (Belgique);
- ◆ J. Van Rijn, ingénieur en chef à la Direction de la Voie de la Société Nationale des Chemins de fer belges;
- ◆ W. A. Vrielynck, directeur du Service de la Tractio et du Matériel de la Société Nationale des Chemins de fer vicinaux (Belgique);
- ◆ J. W. Watkins, operating superintendent, London Midland Region, British Railways;
- ◆ O. G. Weberg, ingénieur en chef à la Direction Générale des Chemins de fer de l'Etat danois.

## D. — PRINCIPAL SECRETARIES.

- ◆ J. Dubus (\*), ingénieur en chef attaché à la Direction générale de la Société Nationale des Chemins de fer belges;
- ◆ H. Lenfant, ingénieur principal à la Société Nationale des Chemins de fer belges;
- ◆ Uytborck (\*), ingénieur à la Société Nationale des Chemins de fer belges;
- ◆ F. Van Lierde, ingénieur en chef à la Société Nationale des Chemins de fer vicinaux (Belgique);
- ◆ E. Voordecker, ingénieur en chef à la Société Nationale des Chemins de fer belges.

### E. — SECTION SECRETARIES.

- ◆ A. E. Beresford, ingénieur, British Railways;
- ◆ Bonnefon, inspecteur divisionnaire au Service technique du Matériel et de la Traction de la Société Nationale des Chemins de fer français;
- ◆ H. V. Boonen, assistant to the Representative of the British Railways, at Brussels;
- ◆ Brechot, ingénieur, Chef de la subdivision de la Documentation au Service technique de la Direction Générale de la Société Nationale des Chemins de fer français;
- ◆ E. Constant, engineer, personal assistant to the Chief Civil Engineer, Southern Region, British Railways;
- ◆ D<sup>r</sup> Ing. G. Contaldi, inspecteur principal au Service de la Voie des Chemins de fer de l'Etat italien;
- ◆ Delacour, inspecteur divisionnaire au Service central du Mouvement de la Société Nationale des Chemins de fer français;
- ◆ D<sup>r</sup> A. Favara, inspecteur en chef au Service Commercial et du Trafic des Chemins de fer de l'Etat italien;

- ◆ D<sup>r</sup> Ing. L. Ferretti, ingénieur de 2<sup>e</sup> classe au Service de la Voie des Chemins de fer de l'Etat italien;
- ◆ J. H. Glendinning, district engineer, The Railway Executive, Eastern Region, British Railways;
- ◆ D<sup>r</sup> Ing. G. Levi, All. Inspecteur au Service du Matériel et de la Traction des Chemins de fer de l'Etat italien;
- ◆ P. E. Punt, British Railways;
- ◆ Surleau, sous-chef d'Etudes administratives au Service Commercial de la Société Nationale des Chemins de fer français;
- ◆ D<sup>r</sup> F. Tilli, inspecteur principal au Service du Mouvement des Chemins de fer de l'Etat italien;
- ◆ Unal, ingénieur, Chef de la Subdivision de l'Entretien de la Région de la Méditerranée de la Société Nationale des Chemins de fer français.

### F. — GENERAL INTERPRETER.

- ◆ Prof. A. Velleman.

## II. — Members appointed by adherent Governments and by affiliated Railway Administrations and Organisations.

### A. — GOVERNMENTS AND THEIR DELEGATES.

#### Belgique (Belgium).

##### *Ministère des Communications :*

- ◆ M. Malderez (\*), secrétaire général du Ministère des Communications (member of the Permanent Commission);
- ◆ J. Vrebos, directeur général de l'Administration des Transports;
- ◆ J. Gordts, chef de division à l'Administration des Transports;
- ◆ Degive, secrétaire de Cabinet.

##### *Ministère des Colonies :*

- ◆ E. De Backer, inspecteur royal des Colonies.

#### Danemark (Denmark).

##### *Ministère des Travaux publics :*

- ◆ P. Christensen, secrétaire général au Ministère des Travaux publics;
- ◆ E. D. F. Terkelsen (\*), directeur général des Chemins de fer (member of the Permanent Commission);
- ◆ E. G. Petersen, conducteur de locomotives.

#### Espagne (Spain).

##### *Ministère du Fomento :*

- ◆ F. Turell, sous-secrétaire des Travaux publics;
- ◆ J. M. Garcia-Lomas, directeur général des Chemins de fer, Tramways et Transports routiers;
- ◆ G. Torres-Quevedo, inspecteur général des Chaussées, Canaux et Ports.

#### France, Protectorats et Colonies (France, Protectorates and Colonies).

##### a) FRANCE.

##### *Ministère des Travaux publics et des Transports :*

- ◆ Dorges (\*), secrétaire général aux Travaux publics, directeur général des Chemins de fer et des Transports (member of the Permanent Commission);
- ◆ Besnard (\*), chef de service adjoint au Directeur Général des Chemins de fer et des Transports (member of the Permanent Commission);
- ◆ Favière, inspecteur général des Ponts et Chaussées, chef du Service du Contrôle technique des Chemins de fer.
- ◆ Crêange, ingénieur en chef des Ponts et Chaussées, ingénieur en chef des Transports, chargé du contrôle de l'Exploitation;
- ◆ Julien, ingénieur en chef des Ponts et Chaussées, ingénieur en chef des Transports, chargé du contrôle des Installations fixes.
- ◆ Prot, ingénieur en chef des Ponts et Chaussées, ingénieur en chef des Transports, chargé du contrôle du Matériel et de la Traction.

##### b) PROTECTORATES AND COLONIES.

##### Tunisie (Tunisia).

- ◆ Y. Giroud, chef du service des Transports à la Direction des Travaux publics de Tunisie.

#### Grande-Bretagne (Great Britain).

##### *Ministry of Transport :*

- ◆ Sir Gilmour Jenkins (\*), secretary to Minister of Transport (member of the Permanent Commission);

- ◆ Sir Cyril Birchnell, deputy secretary, Inland Transport;
- ◆ Lt. Col. George R. S. Wilson, chief inspecting officer of Railways;
- ◆ G. Thorneycroft, general secretary, Railway Clerks' Association.

#### Greece (Greece).

- ◆ N. Siganos, directeur du Ministère des Transports.

#### Indes (India).

##### *Ministry of Railways (Railway Board) :*

- ◆ K. C. Bakhle, chief commissioner of Railways;
- ◆ B. B. Varma, general manager, East Indian Railway;
- ◆ C. H. De Souza, deputy chief mechanical engineer, Great Indian Peninsula Railway;
- ◆ V. V. Bhide, traffic officer, Bombay Baroda and Central India Railway.

#### Irlande (Ireland).

- ◆ D. Morrissey, Minister for Industry and Commerce;
- ◆ Shanagher, parliamentary secretary to Ministry of Commerce.

#### Luxembourg (Luxemburg).

##### *Commissariat du Gouvernement luxembourgeois pour les Chemins de fer :*

- ◆ A. Clemang, commissaire du Gouvernement pour les Affaires de Chemins de fer.

#### Pakistan (Pakistan).

- ◆ H. Sparrow, chief mechanical engineer, North Western Railways;
- ◆ M. H. Elliott, deputy chief engineer, East Bengal Railway.

#### Pays-Bas (Netherlands).

##### *Ministère des Transports et du Waterstaat :*

- ◆ G. Joustra, président du Conseil des Cheminots néerlandais et président de l'Association néerlandaise des Cheminots et Tramwaymen;
- ◆ H. van Galen Last, directeur général des Transports au Ministère des Transports et du Waterstaat.

#### Suède (Sweden).

##### *Ministère des Communications :*

- ◆ A. Nelgard, vice-président, Sv. Järnvägsmannaförbundet;
- ◆ H. Winberg, premier secrétaire au Ministère des Communications.

#### Suisse (Switzerland).

##### *Département des Postes et des Chemins de fer :*

- ◆ F. Steiner (\*), directeur de l'Office Fédéral des Transports (member of the Permanent Commission);
- ◆ O. Hirzel, chef de section de l'Office Fédéral des Transports;
- ◆ R. Bratschi, conseiller national, secrétaire général de la Fédération suisse des cheminots.

#### Thailande (Thailand).

- ◆ L. Videt Yontrakich, chief civil engineer, Royal S. Railways;
- ◆ Major S. Chulacharitta, chief of goods division, Royal State Railways.

#### Yougoslavie (Yugoslavia).

- Ing. J. Milenko, professeur à la Faculté Technique de Belgrade;
- ◆ Ing. S. Milko, professeur à la Faculté Technique Zagreb.

#### B. — DELEGATES OF THE AFFILIATED RAILWAY ADMINISTRATIONS.

##### Allemagne Occidentale (Western Germany).

##### *Deutsche Bundesbahn :*

- ◆ Dr Ing. h. c. W. Helberg, Generaldirektor;
- ◆ Dr K. Ottmann, Ministerialdirigent;
- ◆ W. Singelmann, Amtsrat;
- ◆ F. Flemming, Ministerialrat;
- ◆ R. Körner, Ministerialrat;
- ◆ Dr Ing. E. Halank, Ministerialdirektor;
- ◆ Dr Ing. E. Recker, Ministerialrat;
- ◆ W. Hootz, Ministerialrat;
- ◆ W. Koch, Abteilungspräsident;
- ◆ Dr Ing. H. W. Sasse, Oberrat;
- ◆ E. Kreidler, Abteilungspräsident;
- ◆ G. Rehberger, Oberrat.

##### Autriche (Austria).

##### *Chemins de fer fédéraux autrichiens :*

- ◆ Dr E. Seidler, Generaldirektor;
- ◆ Dr E. Bezpalec, Ministerialrat, Abteilungsleiter;
- ◆ Dr Ing. O. Bazant, Zentralinspektor.

##### Belgique et Colonie (Belgium and Colony).

##### a) BELGIUM.

##### *Société Nationale des Chemins de fer belges :*

- ◆ F. H. Delory (\*), directeur général, president of Permanent Commission;
- ◆ Dr A. Huyberechts (\*), directeur général adjoint (member of the Permanent Commission and Reporter);
- ◆ P. Nolet de Brauwere (\*), secrétaire général (member of the Permanent Commission);
- ◆ G. Claeys, président du Comité permanent;
- ◆ L. Lelarge, 2<sup>e</sup> vice-président du Conseil d'administration;
- ◆ P. Ghilain (\*), directeur du Service du Matériels des Achats (vice-president and general secretary of Permanent Commission);
- ◆ J. Boucqué (\*), directeur du Service de la Voie (member of the Permanent Commission);
- ◆ E. Derijckere (\*), directeur du Service de l'Electrification et de la Signalisation (Reporter);
- ◆ J. Vanderborght (\*), directeur du Service de l'Exploitation (member of the Permanent Commission);

- ◆ G. Moulart, ingénieur en chef au Service de l'Exploitation;
- ◆ J. Van Rijn, ingénieur en chef du Service de la Voie (Reporter);
- ◆ A. Huys (\*), inspecteur en chef au Service du Personnel (Special Reporter);
- ◆ F. Baeyens, ingénieur principal au Service du Matériel et des Achats;
- ◆ R. Squilbin, ingénieur au Service du Matériel et des Achats;
- ◆ E. F. Loquet (\*), ingénieur au Service du Matériel et des Achats (Reporter);
- ◆ J. Dubus (\*), ingénieur en chef (Principal Secretary);
- ◆ E. Voordecker (\*), ingénieur en chef (Principal Secretary);
- ◆ Uytborek (\*), ingénieur (Principal Secretary);
- ◆ H. Lenfant (\*), ingénieur principal (Principal Secretary).

*Société Nationale des Chemins de fer vicinaux :*

- L. de Lichtervelde, président du Conseil d'administration;
- ◆ A. De Bruyne, vice-président du Conseil d'administration;
  - ◆ E. Claeys, administrateur;
  - ◆ M. Devos (\*), directeur général (member of the Permanent Commission);
  - ◆ E. De Cock, directeur;
  - ◆ W. A. Vrielynck (\*), directeur (Reporter);
  - ◆ F. Van Lierde, ingénieur en chef (Principal Secretary);
  - ◆ P. A. Thomas (\*), ingénieur principal (Reporter).

*Compagnie générale d'Entreprises électriques et industrielles « Electobel » :*

- ◆ G. Ithier, ingénieur, vice-président.

*Railways économiques de Liège-Seraing et extensions :*

- ◆ P. Lalou, administrateur.

*Compagnie belge de Chemins de fer et d'Entreprises :*

- ◆ L. Depoorter, administrateur, directeur général.

b) COLONY.

*Chemin de fer du Bas-Congo au Katanga :*

- ◆ M. Van Mulders, directeur;
- ◆ J. De Busschere, directeur;
- ◆ C. Delelienne, directeur adjoint;
- ◆ H. Menestret, directeur adjoint;
- ◆ J. Severijns, ingénieur en chef.

*Office d'exploitation des transports coloniaux « Otraco » :*

- P. Charles, président;
- H. Baillieux, administrateur-gérant;
- ◆ Ch. Richelot, directeur technique.

*Chemins de fer vicinaux du Congo :*

- ◆ Baron A. Allard, administrateur;
- ◆ M. Duquesne, ingénieur en chef, directeur technique.

**Birmanie (Burma),**

- Burma Railways :*  
E. M. Tanner, engineer (Signals).

**Danemark (Denmark).**

- Chemins de fer de l'Etat :*
- ◆ R. C. Jyrdal, directeur des Services commerciaux et des Finances;
  - ◆ T. F. Engqvist, directeur des Services des Voies et Bâtiments;
  - ◆ W. Herschend, chef de district;
  - ◆ L. G. V. Humle, chef de district;
  - ◆ O. G. Weberg (\*), ingénieur principal (Reporter);

*Chemin de fer privé d'Aalborg :*

- ◆ G. Ch. Rendbeck, président de la Direction;
- ◆ K. M. Kjaer, ingénieur civil, directeur.

- Chemin de fer de l'Est de Seeland :*  
H. P. Jensen-Stevns, président.

*Chemin de fer de la Fionie méridionale :*

- ◆ S. Neumann, ancien préfet de la Fionie, président de la Direction;
- ◆ P. Hansen, directeur en chef.

*Chemin de fer de Lolland-Falster :*

- ◆ H. Tiemroth, secrétaire.

**Egypte (Egypt).**

*Chemin de fer de l'Etat :*

- ◆ Dr Sayed Abdel Wahid Bey (\*), general manager (member of the Permanent Commission);
- ◆ Hamdy Gamal-El-Dine, deputy inspector general, Way and Works Department;
- ◆ Mahmoud Magdy, director of the Technical Section, Mechanical Department.

**Espagne (Spain).**

*Réseau National des Chemins de fer espagnols :*

- ◆ Rafael Rubio, membre du Conseil d'administration;
- ◆ José-Maria Rivero de Aguilar (\*), directeur général et membre du Conseil d'Administration (member of the Permanent Commission);
- ◆ Faustino Villamil (\*), directeur adjoint (member of the Permanent Commission);
- ◆ Alfredo Moreno Uribe, sous-directeur;
- ◆ Javier Tapia (\*), ingénieur en chef du Département électrique (Reporter);
- ◆ Antonio Aceña, ingénieur en chef du Service de statistique.

*Compagnie générale des Chemins de fer catalans :*

- O. Lagasse, directeur;
- ◆ G. Turell, sous-directeur.

### Finlande (Finland).

#### *Chemins de fer de l'Etat :*

- ◆ H. Roos, directeur général;
- ◆ L. M. Varanki, directeur du Service de la Voie;
- ◆ M. E. Ivalo, directeur du Service du Matériel et de la Traction;
- ◆ U. M. Varjonen, directeur du Service commercial;
- ◆ N. G. Narvala, inspecteur au Service commercial;
- ◆ J. N. Lennes, directeur adjoint du Service de l'Exploitation.

### France, Protectorats et Colonies (France, Protectorates and Colonies).

#### a) FRANCE.

##### *Société Nationale des Chemins de fer français :*

- ◆ R. Claudon (\*), vice-président du Conseil d'administration (member of the Permanent Commission);

D. Boutet (\*), vice-président honoraire du Conseil d'administration (member of the Permanent Commission);

L. Armand (\*), directeur général (member of the Permanent Commission);

Ch. Boyaux, directeur général adjoint;

◆ M. Lemaire (\*), directeur à la Société Nationale des Chemins de fer français (member of the Permanent Commission);

◆ J. M. Goursat (\*), directeur de la Région du Nord (vice-président de la Commission permanente);

J. Dargeou (\*), directeur du Service Central du Mouvement (member of the Permanent Commission);

◆ R. Lévi (\*), directeur, chef du Service Technique des Installations fixes (member of the Permanent Commission);

◆ A. Parmantier, directeur, chef du Service Technique du Matériel et de la Traction;

◆ L. Delacarte, chef du Service de l'Exploitation de la Région du Sud-Est;

◆ P. Bertrand, directeur du Service Central du Personnel;

◆ H. Flament, chef adjoint du Service Central du Personnel, chef de la Division Centrale du Service Social et Médical;

◆ Dr L. Bazy, médecin en chef de la Région du Sud-Ouest;

◆ C. Thomas, chef du Service de la Comptabilité Générale et des Finances;

◆ R. Dugas (\*), directeur, chef du Service Technique de la Direction Générale (Reporter);

◆ J. Girette (\*), chef du Service de l'Exploitation de la Région du Sud-Ouest (Reporter);

◆ O. Leduc (\*), ingénieur en chef du Service Technique des installations fixes (Reporter);

◆ G. Chan (\*), ingénieur en chef des Etudes du Matériel au Service Technique du Matériel et de la Traction (Reporter);

◆ A. Lamarque (\*), ingénieur en chef, chef de Division du Mouvement et de la Région du Nord (Reporter);

◆ M. Marchand (\*), ingénieur en chef, chef de la Division de la Réglementation et de la Sécurité au Service du Mouvement (Reporter);

◆ P. Marois (\*), directeur au Service Commercial, (Special Reporter);

◆ Bonnefon (\*), inspecteur divisionnaire au Service Technique du Matériel et de la Traction (Section Secretary);

◆ Delacour (\*), inspecteur divisionnaire au Service Central du Mouvement (Section Secretary);

◆ Brechot (\*), ingénieur, chef de la Subdivision de Documentation au Service Technique de la Direction Générale (Section Secretary);

◆ Surleau (\*), sous-chef d'Etudes administratives du Service Commercial (Section Secretary);

◆ Unal, ingénieur, chef de la Subdivision de l'Entreprise de la Région de la Méditerranée (Section Secretary);

#### *Chemins de fer départementaux :*

- J. de Roquemaurel, administrateur-directeur général; P. Zens, directeur.

#### *Société générale des Chemins de fer économiques :*

- ◆ O. Henry-Gréard, président du Conseil d'administration;

◆ J. Grignon, directeur général;

◆ Guicheteau, sous-directeur;

◆ Ripert (\*), ingénieur en chef du Service de la Voie des Travaux (Reporter).

#### *Chemins de fer économiques du Nord :*

- ◆ M. Tissier, directeur général.

#### *Régie autonome des Transports parisiens :*

- ◆ M. Jamet, directeur du réseau ferré de la Régie.

#### *Chemins de fer secondaires du Nord-Est :*

- ◆ P. Riboud, administrateur, ancien président du conseil d'administration;

◆ R. Vincent, président du Conseil d'administration.

#### *Compagnie Générale de Voies ferrées d'intérêt local :*

- ◆ A. Lévy, président, directeur général;

◆ E. Ytasse, directeur général adjoint.

### COLONIES AND PROTECTORATES.

#### *Chemin de fer de Gafsa :*

- ◆ F. Breynaert, directeur général;

◆ P. Louvel, inspecteur général.

#### *Compagnie Fermière des Chemins de fer tunisiens :*

- ◆ Brugère, administrateur;

◆ J. Moreau-Defarges, administrateur;

◆ A. Barbaut, directeur;

◆ J. Masseron, ingénieur, chef du Service de la Voie des Travaux;

◆ Y. Houdiard, secrétaire général.

#### *Chemin de fer de la Méditerranée au Niger :*

- ◆ P. Jacquinot, ingénieur général au Ministère France d'Outre-Mer, secrétaire du Conseil du Réseau;

◆ H. Quetand, inspecteur principal de la Main-d'œuvre des Transports au Ministère des Travaux publics, secrétaire du Conseil du Réseau.

*Chemins de fer de l'Afrique Equatoriale française et du Cameroun :*

- ◆ P. Darnault, président du Comité de Direction de la Régie des Chemins de fer du Cameroun;
- ◆ P. Cendre, directeur adjoint de la Régie des Chemins de fer du Cameroun;

R. Malacam, directeur du Chemin de fer Congo-Océan.

*Chemins de fer de l'Afrique Occidentale française et du Togo :*

- ◆ J. P. Bosc, directeur général de l'Office central des Chemins de fer de la F. O. M. (France d'Outre-Mer);
- H. Cumeo, directeur fédéral de la Régie des Chemins de fer de l'A. O. F.;

◆ P. Jacquinot (\*), chef du Service des Transports de la Direction des Travaux publics de la F. O. M. (represents also the Chemins de fer Méditerranée-Niger);

R. Reydellet, chef de la Section des Transports du Ministère de la F. O. M.;

◆ C. Babouard, chef des Services Administratifs à l'Office Central des Chemins de fer de la F. O. M.;

◆ A. Renouf, chef de la Section des Achats de l'Office Central des Chemins de fer de la F. O. M.;

◆ J. Baudier, chef du Service Commercial de la Régie des Chemins de fer de l'A. O. F.;

◆ P. Pialoux, chef des Services Techniques et du Matériel, Office Central des Chemins de fer de la F. O. M.

*Chemins de fer du Maroc :*

P. Adoin, directeur général.

*Chemins de fer de Madagascar :*

◆ F. Surleau, président du Conseil d'administration de l'Office Central;

◆ L. Coursin, directeur des Travaux publics.;

◆ V. Alfano, directeur des Chemins de fer de Madagascar.

*Chemin de fer Franco-Ethiopien de Djibouti à Addis-Abeba :*

◆ J. Leclerc du Sablon, administrateur-délégué;

◆ M. Rousset, directeur général;

◆ J. Sergent, inspecteur général.

*Compagnie française des Chemins de fer de l'Indochine et du Yunnan :*

◆ A. Bodin, vice-président, directeur général.

*Chemins de fer de l'Indochine :*

A. Martin, directeur de la Régie des Chemins de fer de l'Indochine;

◆ E. Harter, directeur adjoint de la Régie des Chemins de fer de l'Indochine;

J. Nghiem van Tri, ingénieur principal du Matériel et de la Traction;

◆ P. Protat, ingénieur des Ponts et Chaussées.

Royaume-Uni de Grande-Bretagne et Nord de l'Irlande et territoire dont les relations internationales sont assurées sous la responsabilité du Royaume-Uni.

United Kingdom of Great Britain and Northern Ireland and the territories for whose international relations the United Kingdom is responsible).

*British Railways :*

◆ Lord Hurcomb (\*), chairman, British Transport Commission (member of the Permanent Commission);

◆ Miles Beevor (\*), chief secretary, British Transport Commission (member of the Permanent Commission).

◆ V. M. Barrington-Ward (\*), member of the Railway Executive (member of the Permanent Commission).

◆ D. Blee (\*), member of the Railway Executive (member of the Permanent Commission);

◆ J. C. L. Train (\*), member of the Railway Executive (member of the Permanent Commission).

◆ W. P. Allen, member of the Railway Executive;

◆ J. Bestead, deputy chairman, British Transport Commission;

◆ R. C. Bond, chief officer, Locomotive, Construction and Maintenance, The Railway Executive;

◆ H. H. Cavendish-Fuller, chief medical officer;

◆ J. Elliot, chief regional officer, London Midland Region, The Railway Executive;

◆ R. H. Hacker, chief officer (Continental), The Railway Executive;

◆ A. E. Hammett, commercial superintendent, London Midland Region, The Railway Executive;

◆ J. L. Harrington, chief officer (Administration). The Railway Executive;

◆ D. R. Lamb, agent;

◆ J. Ness, chief officer (New Works), The Railway Executive;

◆ S. E. Parkhouse, chief officer (Operating), The Railway Executive;

◆ Ch. Pickford, executive officer (Terminals), The Railway Executive;

◆ H. Rudgard, chief officer (Motive Power), The Railway Executive;

◆ W. Y. Sandeman, civil engineer, Scottish Region, The Railway Executive;

◆ C. E. R. Sherrington, Railway Research service;

◆ S. B. Warder, mechanical and electrical engineer, Southern Region, The Railway Executive;

◆ J. I. Campbell (\*), civil engineer, Eastern Region, The Railway Executive (Reporter);

◆ H. H. Dyer (\*), chief executive officer, Engineering (Signals and Telecommunications), The Railway Executive (Reporter).

◆ A. A. Harrison (\*), executive officer (Road Transport), The Railway Executive (Reporter);

◆ L. Lynes (\*), technical assistant to Carriage and Wagon engineer, Southern Region, The Railway Executive (Reporter).

◆ E. A. W. Dickson, treasurer-assistant to chief financial officer;

◆ A. C. Raindle, general agent for Italy;

◆ E. Pugson (\*), chief officer, Carriage and Wagon Construction and Maintenance, The Railway Executive (Reporter).

◆ E. W. Rostern (\*), operating superintendent, Eastern and North Eastern Regions, The Railway Executive (Reporter);

◆ J. W. Watkins (\*), operating superintendent, London Midland Region, The Railway Executive (Reporter).

◆ Ch. E. Whitworth (\*), assistant to chief officer (Administration), The Railway Executive (assistant general secretary);

◆ A. J. Pearson, chief officer (Administration);

◆ J. H. Glendinning, district engineer, The Railway Executive, Eastern Region (Section secretary);

◆ A. E. Beresford (Section secretary);

- ◆ P. E. Punt (Section secretary);
- ◆ H. V. Boonen, assistant to the representative of the Southern Region at Brussels (Section secretary);
- ◆ M. E. Constant, engineer, personal assistant to the Chief Civil Engineer, Southern Region (Section secretary).

*London Transport Executive :*

- ◆ J. Cliff, deputy chairman;
- ◆ A. Grainger, member of the Executive;
- ◆ P. Croom-Johnson (\*), chief engineer (Reporter).
- ◆ Graff-Backer (\*), chief mechanical engineer (Railways) (Reporter).

*East African Railways and Harbour :*

- ◆ J. R. Farquharson (\*), chief engineer (Reporter).
- ◆ T. W. Eydes, assistant engineer.

*Nigerian Railways :*

- ◆ G. H. Binnie, works manager.

*South African Railways :*

- ◆ H. W. Jackson (\*), chief signal engineer (Reporter).
- ◆ G. Lindenberg (\*), advisory engineer, Sudan Railways.
- N. H. Gibbins, assistant chief mechanical engineer.

*Malayan Railways :*

- ◆ J. O. Sanders, general manager;
- ◆ B. Sanderson, assistant to general manager.

*New Zealand Government Railways :*

- ◆ R. J. Harvey (\*), consulting engineer to the Government of New Zealand (member of the Permanent Commission).
- ◆ G. S. J. Read, chief inspecting engineer.

**Grèce (Greece).**

*Chemins de fer de l'Etat hellénique :*

- ◆ S. Gialistras, directeur général;
- ◆ J. Samardzis, directeur des Travaux neufs;
- K. Pantazis, membre du Conseil administratif.

*Chemins de fer Pirée-Athènes-Péloponèse :*

- ◆ C. Melissinos, directeur général;
- ◆ G. Papalexandrou, directeur de l'Exploitation;
- ◆ D. Esfratiadis, directeur de la Voie et des Travaux.

*Chemins de fer de Thessalie :*

- A. Stefanopoulos, directeur;
- D<sup>r</sup> C. D. Papaconstantinou, secrétaire général.

**Irlande (Ireland) .**

*Coras Iompair Eireann :*

- ◆ T. C. Courtney (\*), chairman (member of the Permanent Commission).
- ◆ O. V. S. Bulleid, consulting mechanical engineer.

**Italie (Italy).**

*Chemins de fer de l'Etat italien :*

- ◆ Dr Ing. G. di Raimondo (\*), directeur général (member of the Permanent Commission, president of the Italian Local Organizing commission and president of the Session);
- ◆ Dr Ing. F. Marin (\*), vice-directeur général (member of the Permanent Commission, (vice president of Italian Local Organizing commission);
- ◆ Dr Ing. Ettore Lo Cigno (\*), vice-directeur général (vice-president of the Italian Local Organizing commission);
- ◆ Dr Ing. Cleto Biondi (\*), chef du Service du Mouvement (member of the Italian Local Organizing commission);
- ◆ Dr Ing. Gino Bracci (\*), chef du Service des Appareillages (member of the Italian Local Organizing commission);
- ◆ Dr Ing. Giovanni Caliendo (\*), chef du Service financier (member of the Italian Local Organizing commission);
- ◆ Dr Ing. Amedeo Cuttica (\*), chef du Service du Matériel et de la Traction (member of the Italian Local Organizing commission);
- ◆ Dr Ing. Mario Eula (\*), chef du Compartiment de Rome (member of the Italian Local Organizing commission);
- ◆ Dr Ing. F. Fazio (\*), chef de service au Service de la Voie (électricité et signalisation) (member of the Italian Local Organizing commission);
- ◆ Dr Prof. Nicola Laloni (\*), chef du Service Commercial et du Trafic (member of the Permanent Commission, member of the Italian Local Organizing commission);
- ◆ Dr Ing. Giorgio Lasz (\*), chef du Service du Personnel et des Affaires Générales (member of the Italian Local Organizing commission);
- ◆ Dr Ing. Lino Onesti (\*), chef du Service de la Voie et des Constructions (member of the Italian Local Organizing commission);
- ◆ Dr Ing. Giovanni Robert (\*), directeur de la Rete Ingegneria Ferroviaria (member of the Italian Local Organizing commission);
- ◆ Dr Ing. Mario Valdivieso (\*), inspecteur en chef du Service du Personnel et des Affaires générales (Secretary of the Italian Local Organizing commission);
- ◆ Dr Giuseppe Santoni Rugiu (\*), inspecteur en chef du Service Commercial et du Trafic (secretary of the Italian Local Organizing commission);
- ◆ Luigi Broglia (\*), inspecteur principal au Service du Personnel et des Affaires Générales (secretary of the Italian Local Organizing commission);
- ◆ On. Dr Ing. G. Corbellini, sénateur de la République;
- ◆ Ing. G. Arias, inspecteur en chef supérieur;
- ◆ Ing. A. Riggio, inspecteur en chef;
- ◆ Ing. E. Orlandini, inspecteur en chef supérieur;
- ◆ Dr A. Di Lullo, inspecteur en chef supérieur (Central Sanitaire);
- ◆ D. Cecchi, inspecteur en chef (Service Financier);
- ◆ W. Panicelli, inspecteur en chef (Service Commercial et du Trafic);
- ◆ F. Santoro, inspecteur en chef (Service Commercial et du Trafic);
- ◆ Ing. V. De Rosa, inspecteur en chef supérieur (Service du Mouvement);
- ◆ Ing. E. Tenti, inspecteur en chef;

- ◆ D<sup>r</sup> Ing. F. Strocchi, inspecteur en chef supérieur au Service du Matériel et de la Traction;
- ◆ D<sup>r</sup> Ing. M. A. Fanelli, inspecteur en chef supérieur au Service du Matériel et de la Traction;
- D<sup>r</sup> Ing. L. Zamboni, inspecteur en chef au Service du Matériel et de la Traction;
- ◆ F. Vezzani, inspecteur général de la Motorisation civile des Transports en concession;
- ◆ Av. A. Morganti (\*), inspecteur en chef de la Motorisation civile et des Transports en concession (assistant secretary of the Italian Local Organizing Commission);
- ◆ E. Roscioni, inspecteur en chef de la Motorisation civile et des Transports en concession;
- ◆ D<sup>r</sup> Ing. G. C. Palmieri, chef de service principal, conseiller d'Administration;
- ◆ D<sup>r</sup> Ing. S. Dorati, chef de service principal, conseiller d'Administration;
- ◆ D<sup>r</sup> Ing. Prof. G. Polsoni (\*), inspecteur en chef au Service de la Voie (Reporter);
- ◆ D<sup>r</sup> Ing. B. Renda (\*), chef du Service de la Voie (Reporter).
- ◆ D<sup>r</sup> Ing. M. Martinelli (\*), inspecteur en chef au Service du Matériel et de la Traction (Reporter).
- ◆ D<sup>r</sup> Ing. A. d'Arbela (\*), inspecteur en chef supérieur au Service du Matériel et de la Traction (Reporter).
- ◆ D<sup>r</sup> Ing. M. Fasoli (\*), inspecteur en chef au Service du Matériel et de la Traction (Reporter).
- ◆ D<sup>r</sup> Ing. M. Cirillo (\*), inspecteur en chef supérieur au Service du Mouvement (Reporter).
- ◆ D<sup>r</sup> Ing. R. Righi (\*), inspecteur en chef supérieur au Service de la Voie (Reporter).
- ◆ D<sup>r</sup> Ing. M. Diegoli (\*), inspecteur en chef au Service du Matériel et de la Traction (Reporter).
- ◆ D<sup>r</sup> Ing. U. Cantutti (\*), inspecteur en chef supérieur au Service du Matériel et de la Traction (Special Reporter).
- ◆ D<sup>r</sup> Ing. L. Ferreti (\*), ingénieur de 2<sup>e</sup>classe au Service de la Voie (Section secretary);
- ◆ D<sup>r</sup> Ing. G. Levi (\*), inspecteur du Service du Matériel et de la Traction (Section secretary);
- ◆ D<sup>r</sup> F. Tilli (\*), inspecteur principal au Service du Mouvement (Section secretary);
- ◆ D<sup>r</sup> A. Favara (\*), inspecteur en chef au Service Commercial et du Trafic (Section secretary);
- ◆ D<sup>r</sup> Ing. G. Contaldi (\*), inspecteur principal au Service de la Voie (Section secretary).

*Chemins de fer de la Méditerranée :*

- ◆ E. Denti, vice-président;
- ◆ R. Radici, conseiller délégué;
- ◆ R. Rosati, directeur de l'exploitation du Chemin de fer Calabro Lucane.

*Chemin de fer du Nord de Milan :*

- ◆ A. Ferrario, administrateur;
- ◆ G. Bianchi, administrateur délégué.

*Azienda Tranviaria Municipale-Milano :*

- E. Marchini, ingénieur en chef du Service de l'Exploitation;
- I. Angelini, ingénieur dirigeant du Service de l'Exploitation (Réseau interurbain).

*Societa Nazionale di Ferrovie e Tramvie :*

- ◆ Comm. Avv. L. Ottone, administrateur délégué.

*S. A. Torinese Tramvie intercomunali :*

- ◆ F. Giupponi, directeur.

*Societa Tramvie Elettriche Bresciane :*

- ◆ D<sup>r</sup> Ing. A. Bauer, consigliere delegato e Direttore Generale.

*Société Vénitienne pour la construction et l'exploitation de Chemins de fer secondaires en Italie :*

- ◆ D<sup>r</sup> M. Fabro, président;
- ◆ Ing. G. Fattori, directeur.

*Compagnie du Chemin de fer Danubio-Sava-Adriatico :*

- ◆ L. Macallini, directeur général;
- ◆ A. Weissel, directeur général adjoint.

*Luxembourg (Luxemburg).*

*Société Nationale des Chemins de fer luxembourgeois :*

- ◆ J. P. Musquar, directeur général;
- ◆ P. Wehenkel, ingénieur en chef.

*Norvège (Norway).*

*Chemins de fer de l'Etat norvégien :*

- ◆ O. Holtmon, directeur en chef;
- ◆ E. Kiil, chef du Service de la Prospérité;
- ◆ J. Thomseth, chef de division;
- ◆ E. Heiberg, directeur au Service du Mouvement;
- ◆ Sven Boye (\*), inspecteur principal (Reporter).

*Pays-Bas (Netherlands).*

*S. A. des Chemins de fer néerlandais :*

- ◆ Ing. F. Q. den Hollander (\*), président de la Direction Générale (member of the Permanent Commission);
- ◆ D<sup>r</sup> D. J. Wansink, directeur général;
- ◆ D<sup>r</sup> F. F. de Bruijn, chef du Service Général;
- ◆ Ing. G. P. de Haas, chef adjoint du Service de la Traction et du Matériel;
- ◆ Ing. A. W. Olivier (\*), ingénieur en chef du Service de la Traction et du Matériel (Reporter);
- ◆ Ing. B. M. C. Boot, inspecteur en chef du Service du Mouvement;
- ◆ E. Maas Geesteranus, ingénieur en chef du Service des Voies et Travaux;
- ◆ J. Kater, chef adjoint du Service de la Traction et du Matériel.

*Portugal (Portugal).*

a) CONTINENT.

*Compagnie des Chemins de fer Portugais :*

- ◆ R. Esteves, administrateur;
- ◆ M. de Figueiredo, administrateur;
- ◆ A. A. M. de Campos Henriques, sous-directeur;
- ◆ R. de Espregueira Mendes, directeur général;
- A. L. Sousa Rego, chef de la Division de l'Exploitation;

- ◆ S. Horta e Costa **Henriques**, sous chef de Division du Matériel et de la Traction;
- ◆ J. S. **Perestrelo Guimaraes**, ingénieur principal à la Division de la Voie et des Travaux;
- ◆ J. A. **Machado Vaz**, ingénieur conseil.

### b) COLONIES.

*Chemins de fer de l'Etat dans les Colonies portugaises :*

- ◆ J. A. **Lopes Galvao**, ingénieur, inspecteur des Travaux publics et membre du Conseil Technique du Foment Colonial;
- ◆ **Sales Lane**, ingénieur au Ministère des Colonies.

*Compagnie du Chemin de fer du Benguela :*

- ◆ Ing. C. **Manito Torres**, ingénieur;
- ◆ Ing. José Duarte **Ferreira**, président des commissaires.

### Suède (Sweden).

*Chemins de fer de l'Etat suédois :*

- ◆ E. G. J. **Üpmark** (\*), directeur général en chef (member of the Permanent Commission).
- K. H. **Sandström**, ingénieur en chef, directeur;
- B. G. O. **Elwing**, chef de Région;
- ◆ S. H. N. **Camp**, ingénieur, directeur adjoint;
- ◆ L. A. **Karsberg**, ingénieur, directeur adjoint;
- ◆ E. **Sjoberg** (\*), directeur adjoint (Reporter).
- B. G. **Stille**, ingénieur principal;
- ◆ G. F. **Holvid**, chef de division adjoint;
- ◆ M. R. **Blomberg**, chef de Région.

*Chemin de fer Nora-Bergslag :*

- ◆ H. **Malmquist**, directeur.

*Chemins de fer Nordmark-Klarelfven :*

- ◆ E. **Fredrikson**, consulting engineer.

*Oxelösund-Flen-Västmanlands Jernvägsaktiebolag :*

- ◆ L. **Granfeld**, directeur gérant;
- ◆ E. **Hedin**, ingénieur en chef au Service Technique du Matériel et de la Traction.

 *Chemin de fer Stockholm-Roslag :*

- ◆ C. **Landin**, ingénieur en chef de la Voie;
- ◆ C. J. **Schmidt**, ingénieur en chef de la Traction.

### Suisse (Switzerland).

*Chemins de fer fédéraux suisses :*

- ◆ C. **Lucchini** (\*), président de la Direction Générale (member of the Permanent Commission).
- ◆ Dr W. **Meile** (\*), Ancien président de la Direction Générale (member of the Permanent Commission);
- ◆ P. **Kradolfer**, directeur général;
- ◆ W. **Wachs**, directeur du II<sup>e</sup> Arrondissement;
- ◆ O. **Wichser**, chef de la Division de la Voie et des Bâtiments;
- H. **Huber**, chef de la division de la Traction et des Ateliers;

- ◆ W. **Tribelhorn**, chef de la Division des Gares et des Trains;
- ◆ F. **Wanner**, secrétaire général;
- ◆ L. **Marguerat** (\*), 1<sup>er</sup> chef de section au Service de la Voie et des Bâtiments (Reporter).
- ◆ Ch. **Hoffet** (\*), chef de section au Service de la Traction et des Ateliers (Reporter).

Itten, avocat, chef de la Division du Personnel.

*Chemin de fer des Alpes bernoises (Berne-Loetschberg-Simplon) :*

- ◆ R. **Grimm**, directeur;
- ◆ Ad. M. **Hug**, ingénieur-conseil.

*Chemins de fer Rhétique :*

- ◆ P. **Buchli**, directeur.

*Chemin de fer de Viège à Zermatt :*

- A. **Marguerat** (\*), administrateur;
- P. **Schneller**, directeur.

*Chemins de fer fribourgeois :*

- ◆ X. **Remy**, directeur.

*Chemin de fer Emmental-Burgdorf-Thun :*

- ◆ K. **Braun**, directeur.

### Syrie (Syria).

*Chemin de fer de Damas-Hama et prolongement :*

- ◆ C. **Chenut**, secrétaire général;
- ◆ J. **Lancronon**, administrateur.

### Turquie (Turkey).

*Chemin de fer et Ports de l'Etat turc :*

- C. **Devrimel**, président du Service Commercial des Tarifs;
- ◆ K. **Oçman**, directeur technique de la Section Moteurs au Service de la Voie;
- S. **Ekmen**, ingénieur en chef au Service de la Voie;
- Z. **Akadurak**, directeur de section au Service Mouvement et des Ports.

### Yougoslavie (Yugoslavia).

*Chemin de fer de l'Etat yougoslave :*

- ◆ Ing. V. **Desic** (\*), professeur à la Faculté Technique de Belgrade, Conseiller permanent du Ministère des mines de fer (member of the Permanent Commission).

### C. — ORGANISMES (ORGANISATIONS)

*Compagnie auxiliaire internationale de Chemin de fer :*

- M. **Caspers**, administrateur délégué;
- J. **Stoclet**, administrateur-directeur général.

*Compagnie internationale des Wagons-Lits et des Grands Express européens :*

◆ R. Margot-Noblemaire, administrateur-directeur général;

A. Widhoff, directeur général adjoint;

P. Mareschal, directeur de l'Exploitation Générale;

◆ A. Pillepich, ingénieur en chef;

◆ D. Poli (\*), représentant des Wagons-Lits en Italie (member of the Italian Local Organizing commission);

◆ L. Novarese, directeur de la Compagnie des Wagons-Lits en Italie;

◆ G. Tribot-Laspire, secrétaire du Conseil d'Administration général.

*Federazione Nazionale Imprese Trasporti :*

◆ Dr A. Azzolini, vice-président;

◆ Dr Ing. M. Cosenza, directeur général.

*Office Central des Transports Internationaux par Chemins de fer :*

◆ Dr R. Cottier (\*), directeur (member of the Permanent Commission).

*Union Internationale des Chemins de fer :*

◆ G. Pader (\*), secrétaire général honoraire de l'U. I. C. conseiller technique attaché à la présidence du Comité de Gérance de l'U. I. C. (member of the Permanent Commission).

◆ J. Tuja, secrétaire général;

◆ P. Rousseau, chef du Secrétariat de l'U. I. C.;

◆ G. Harrand, ingénieur en chef de la S. N. C. F. détaché à l'U. I. C.

*Union des Chemins de fer privés suédois :*

◆ A. Nerell, président;

◆ H. Lundqvist, directeur en chef.

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1079 310 346 105	Camp, S. H. N. . . . . Campbell, J. I. . . . . Cantutti, U. (Dr. Ing.) . . . . . Cappuccio, M. (Dr.) . . . . .	Chemins de fer de l'Etat suédois. . . . . British Railways . . . . . Chemins de fer de l'Etat italien. . . . . Comité Exécutif de la Commission locale italienne d'organisation . . . . .	2, 5 1 5
218	Cardinali, G. (Dr. Prof.) . . . . .	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
1272 1132 330	Cavendish Fuller H. H. (Dr.) . . . . . Cecchi, D. . . . . Chan, G. . . . .	British Railways . . . . . Chemins de fer de l'Etat italien . . . . . Société Nationale des Chemins de fer français . . . . .	4 4 2
1127	Chenut, C. . . . .	Chemin de fer Damas-Hama et prolongements . . . . .	4
911 927	Christensen, P. . . . . Chulacharitta (Major Seang)	Ministère des Travaux Publics (Danemark). . . . . Gouvernement de Thaïlande . . . . .	3, 4 ...

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112	Ciccotti, S. . . . .	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	... 3
323	Cirillo, M. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	3
1058	Claeys, E. . . . .	Société Nationale des Chemins de fer Vicinaux (Belgique) . . . . .	1, 3, 5
1185	Claeys, G. . . . .	Société Nationale des Chemins de fer belges . . . . .	1 to 5
27	Claudon, R. . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer français . . . . .	1, 3
919	Clemang, A. . . . .	Ministère des Transports (Luxembourg) . . . . .	3, 4
1085	Cliff, J. . . . .	London Transport Executive . . . . .	1, 2, 4
610	Constant, M. E. . . . .	British Railways . . . . .	5
620	Contaldi, G. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	5
1285	Corbellini, G. (On. Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	...
1241	Cosenza, M. (Gr. Uff. Dott. Ing.) . . . . .	Federazione Nazionale Imprese Trasporti. Commission permanente de l'Association et Office Central des Transports Internationaux par Chemins de fer . . . . .	...
7	Cottier, R. (Dr.) . . . . .	Chemins de fer de Madagascar . . . . .	...
1176	Coursin, L. . . . .	Permanent Commission of the Association and Coras Iompair Eireann (Ireland) . . . . .	1, 4
26	Courtney, T. C. . . . .	Ministère des Travaux Publics et des Transports (France) . . . . .	2, 3
915	Créange. . . . .	London Transport Executive . . . . .	1, 2, 3, 5
308	Croom-Johnson, P. . . . .	Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
108	Cuttica, A. (Dr. Ing.) . . . . .	Commission Permanente de l'Association. Ministre des Transports d'Italie et Président du Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
37	da Costa Couvreur, R. . . . .	Chemins de fer de l'Etat italien . . . . .	...
201	d'Aragona, L. (On.) . . . . .	Chemins de fer de l'Afrique Equatoriale française et du Cameroun . . . . .	2
321	d'Arbela, A. (Dr. Ing.) . . . . .	Ministère des Colonies (Belgique) . . . . .	5
1171	Darnault, P. . . . .	Chemins de fer néerlandais . . . . .	4
901	De Backer, E. . . . .	Société Nationale des Chemins de fer vicinaux (Belgique) . . . . .	2, 4
1143	de Bruijn, F. F. (Dr.) . . . . .	Chemins de fer du Bas-Congo au Katanga (Congo belge) . . . . .	3
1057	De Bruyne, A. . . . .	Compagnie des Chemins de fer portugais . . . . .	1, 3, 5
1041	De Busschere, J. . . . .	Société Nationale des Chemins de fer vicinaux (Belgique) . . . . .	1, 4, 5
1222	de Campos Henriques, A.A.M. . . . .	Compagnie des Chemins de fer portugais . . . . .	3, 4
1059	De Cock, E. . . . .	Société Nationale des Chemins de fer vicinaux (Belgique) . . . . .	2, 5
1220	de Figueiredo, M. . . . .	Société Nationale des Chemins de fer français . . . . .	3, 4
925	Degive . . . . .	Ministère des Communications (Belgique) . . . . .	...
1145	De Haas, G. P. (Ing.) . . . . .	Chemins de fer néerlandais . . . . .	2, 5
1153	Delacarte, L. . . . .	Société Nationale des Chemins de fer français . . . . .	3, 4
603	Delacour . . . . .	Société Nationale des Chemins de fer français . . . . .	3

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1037	<b>Deleienne, Ch.</b> . . . . .	Chemins de fer du Bas-Congo au Katanga (Congo belge) . . . . .	2
415	<b>de Liedekerke (Comte L.)</b> . .	Association Internationale du Congrès des Chemins de fer . . . . .	4, 5
128	<b>Della Casa, A. (Cav. del Lav.)</b> . .	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
1	<b>Delory, F. H.</b> . . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer belges . . . . .	1 to 5
25	<b>Den Hollander, F. Q. (Ing.)</b> . . .	Commission permanente de l'Association et Chemins de fer néerlandais . . . . .	1 to 5
1019	<b>Denti, E. (Dr. Ing.)</b> . . . . .	Società Italiana per le Strade Ferrate del Mediterraneo. . . . .	1, 2, 3
1005	<b>Depoorter, J.</b> . . . . .	Compagnie belge de Chemins de fer et d'Entreprises . . . . .	1, 4
340	<b>Derijckere, E. J. F.</b> . . . . .	Société Nationale des Chemins de fer belges . . . . .	3
1135	<b>De Rosa, V. (Ing.)</b> . . . . .	Chemins de fer de l'Etat italien. . . . .	1, 3
1267	<b>Desic, V. (Ing.)</b> . . . . .	Commission permanente de l'Association et Ministère des Chemins de fer (Yougoslavie)	3, 4
1233	<b>De Souza, C. H.</b> . . . . .	Railway Board, India . . . . .	2, 4, 5
9	<b>Devos, M.</b> . . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer vicinaux (Belgique). . . . .	4, 5
416	<b>Dickson, E. A. W.</b> . . . . .	British Railways . . . . .	3, 4
325	<b>Diegoli, M. (Dr. Ing.)</b> . . . . .	Chemins de fer de l'Etat italien. . . . .	5
1131	<b>Di Lullo, A. (Dr.)</b> . . . . .	Chemins de fer de l'Etat italien. . . . .	4
121	<b>di Napoli Rampolla (S. E. le Prince Dr. Ing. Don Enzo)</b> . . . . .	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
20	<b>di Raimondo, G. (Dr. Ing.)</b> . . . . .	Commission permanente de l'Association et Chemins de fer de l'Etat italien, Président du Comité Exécutif de la Commission locale italienne d'organisation et Président de la XV <sup>e</sup> Session du Congrès. . . . .	1 to 5
1228	<b>Dorati, S. (Dr. Ing.)</b> . . . . .	Chemins de fer de l'Etat italien. . . . .	1, 3
4	<b>Dorges.</b> . . . . .	Commission permanente de l'Association et Ministère des Travaux Publics et des Transports (France) . . . . .	3, 4
336	<b>Dubus, J.</b> . . . . .	Secrétariat de l'Association Internationale du Congrès des Chemins de fer . . . . .	1
327	<b>Dugas, R.</b> . . . . .	Société Nationale des Chemins de fer français . . . . .	4
403	<b>Dumont, J.</b> . . . . .	Secrétariat de l'Association Internationale du Congrès des Chemins de fer. . . . .	...
1030	<b>Duquesne, M.</b> . . . . .	Chemins de fer Vicinaux du Congo. . . . .	...
312	<b>Dyer, H. H.</b> . . . . .	British Railways . . . . .	1, 3, 5
1198	<b>Efstratiadis, D.</b> . . . . .	Chemins de fer Pirée-Athènes-Péloponèse . . . . .	1, 3, 5
1099	<b>Elliot, J.</b> . . . . .	British Railways . . . . .	2, 3
1230	<b>Elliott, M. H.</b> . . . . .	East Bengal Railway (Pakistan Government) . . . . .	1, 4, 5
1159	<b>Engqvist, T. F.</b> . . . . .	Chemins de fer de l'Etat danois. . . . .	1
1219	<b>Esteves, R.</b> . . . . .	Compagnie des Chemins de fer portugais.	3, 4

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113	Eula, M. (Dr. Ing.) . . . . .	Comité Exécutif de la Commission locale italienne d'Organisation . . . . .	...
1203	Eydes, T. W. . . . .	East African Railways and Harbours . . . . .	...
1238	Fabro, M. (Dott.) . . . . .	Société Vénitienne pour la Construction et l'Exploitation de Chemins de fer secondaires en Italie . . . . .	4, 5
1138	Fanelli, M. A. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	2, 5
333	Farquharson, J. R. . . . .	East African Railways and Harbours . . . . .	1, 4, 5
322	Fasoli, M. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	2
1239	Fattori, G. (Ing.) . . . . .	Société Vénitienne pour la Construction et l'Exploitation de Chemins de fer secondaires en Italie . . . . .	4, 5
619	Favara, A. (Dr.) . . . . .	Chemins de fer de l'Etat italien . . . . .	4
914	Favière . . . . .	Ministère des Travaux Publics et des Transports (France) . . . . .	1, 3, 4
131	Fazio, F. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
1017	Ferrario, A. (Ing.) . . . . .	Chemins de fer du Nord de Milan . . . . .	1, 2, 3, 4, 5
1245	Ferreira, J. D. . . . .	Companhia dos Caminhos de ferro do Benguela . . . . .	2, 3, 4, 5
621	Ferretti, L. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	1
1200	Flament, H. . . . .	Société Nationale des Chemins de fer français . . . . .	4
1251	Flemming, F. . . . .	Deutsche Bundesbahn . . . . .	2, 5
1218	Fredrikson, E. . . . .	Chemin de fer Nordmark-Klarelfven (Suède) . . . . .	1, 2
1207	Lopes Galvao, J. A. . . . .	Chemin de fer de l'Etat dans les Colonies portugaises . . . . .	5
1260	Gamal-El-Dine, Hamdy . . . . .	Egyptian State Railways . . . . .	1, 3, 5
903	Garcia-Lomas, J. M. . . . .	Ministère du Fomento (Espagne) . . . . .	2, 3
2	Ghilain, P. . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer belges . . . . .	1 to 5
1242	Gialistras, S. . . . .	Chemins de fer de l'Etat hellénique . . . . .	3, 4
401	Giot, V. . . . .	Secrétariat de l'Association Internationale du Congrès des Chemins de fer . . . . .	...
328	Grette, J. . . . .	Société Nationale des Chemins de fer français . . . . .	3
913	Giroud, Y. . . . .	Ministère des Travaux Publics (Tunisie) . . . . .	3, 4, 5
1010	Giupponi, F. (Dr. Ing.) . . . . .	S. A. Torinese Tranvie Intercomunali (Italie) . . . . .	2, 4, 5
606	Glendinning, J. E. . . . .	British Railways . . . . .	1
910	Gordts, J. . . . .	Ministère des Communications (Belgique) . . . . .	3, 4
31	Goursat, J. M. . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer français . . . . .	3, 4
309	Graff-Baker, W. S. . . . .	London Transport Executive . . . . .	2
1086	Grainger, A. H. . . . .	London Transport Executive . . . . .	1, 3, 4, 5
1042	Granfeld, L. . . . .	Chemin de fer Oxelösund-Flen-Westmanlands . . . . .	1, 4
1075	Grignon, J. . . . .	Société Générale des Chemins de fer Economiques (France) . . . . .	3, 4, 5

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1013	Grimm, R. . . . .	Chemins de fer des Alpes bernoises. . . . .	3, 4
1076	Guicheteau . . . . .	Société Générale des Chemins de fer Economiques (France) . . . . .	2, 3, 4, 5
1225	Perestrelo Guimaraes, J. S. . . . .	Compagnie des Chemins de fer portugais . . . . .	1, 3, 4
1101	Hacker, R. H. . . . .	British Railways . . . . .	3, 4
1253	Halank, E. (Dr. Ing.) . . . . .	Deutsche Bundesbahn. . . . .	1, 5
1102	Hammett, A. E. . . . .	British Railways . . . . .	3, 4
1050	Hansen, P. . . . .	Chemins de fer de la Fionie Méridionale (Danemark) . . . . .	2, 3, 4
1184	Harrand, G. . . . .	Union Internationale des Chemins de fer . . . . .	3, 4, 5
1103	Harrington, J. L. . . . .	British Railways . . . . .	2, 3, 4
313	Harrison, A. A. . . . .	British Railways . . . . .	3
1179	Harter, E. . . . .	Chemins de fer de l'Indochine. . . . .	3, 4, 5
24	Harvey, Ranald, J. . . . .	Permanent Commission of the Association and New Zealand Government Railways. . . . .	1, 2, 4
1043	Hedin, E. . . . .	Chemins de fer Oxelösund-Flen-Westmanlands (Suède) . . . . .	2
1073	Heiberg, E. . . . .	Chemins de fer de l'Etat norvégien. . . . .	3
1248	Helberg, W. (Dr. Ing. h. c.) . . . . .	Deutsche Bundesbahn . . . . .	4
1074	Henry-Gréard, O. . . . .	Société Générale des Chemins de fer Economiques (France) . . . . .	3, 4, 5
1160	Herschend, W. . . . .	Chemins de fer de l'Etat danois. . . . .	4
918	Hirzel, O. . . . .	Département des Postes et des Chemins de fer (Suisse) . . . . .	1, 3, 4
304	Hoffet, Ch. . . . .	Chemins de fer fédéraux suisses . . . . .	2
12	Holtmon, O. . . . .	Chemins de fer de l'Etat norvégien . . . . .	...
1082	Holvid, G. F. . . . .	Chemins de fer de l'Etat suédois . . . . .	3
1255	Hootz, W. . . . .	Deutsche Bundesbahn . . . . .	3, 4
1224	Horta e Costa Henriques, S. . . . .	Compagnie des Chemins de fer portugais . . . . .	2, 4
1246	Houdiard, Y. . . . .	Compagnie Fermière des Chemins de fer tunisiens . . . . .	3, 4
1195	Hug, Ad. M. . . . .	Chemins de fer des Alpes bernoises . . . . .	1, 2, 5
1161	Humle, L. G. V. . . . .	Chemins de fer de l'Etat danois. . . . .	4, 5
5	Hurcomb (Lord) . . . . .	Permanent Commission of the Association and British Transport Commission. . . . .	3, 4
38	Huyberechts, A. (Dr.) . . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer belges . . . . .	4
342	Huys, A. . . . .	Société Nationale des Chemins de fer belges . . . . .	4
1035	Ithier, G. . . . .	Compagnie Générale d'Entreprises électriques et industrielles «Electrobel» (Belgique). . . . .	2, 4, 5
1202	Itten . . . . .	Chemins de fer fédéraux suisses . . . . .	4
1192	Ivalo, M. E. . . . .	Chemins de fer de l'Etat de Finlande . . . . .	2, 3, 5
335	Jackson, H. W. . . . .	South African Railways and Harbours . . . . .	1, 3
1165	Jacquinot, P. . . . .	Chemins de fer de l'Afrique Occidentale française et du Togo et des Chemins de fer de la Méditerranée au Niger . . . . .	1, 4
1045	Jamet, M. G. . . . .	Régie Autonome des Transports Parisiens . . . . .	2, 3, 4
45	Jenkins, (Sir Gilmour) . . . . .	Permanent Commission of the Association and Ministry of Transport (Great Britain) . . . . .	...

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905	Joustra, G. . . . .	Ministère des Transports et du Waterstaat (Pays-Bas) . . . . .	1, 2, 3, 4
916	Julien . . . . .	Ministère des Travaux Publics et des Transports (France) . . . . .	1, 3, 4
1158	Jyrdal, R. C. . . . .	Chemins de fer de l'Etat danois. . . . .	4
1080	Karsberg, A. L. . . . .	Chemins de fer de l'Etat suédois . . . . .	3
1114	Kater, J. . . . .	Chemins de fer néerlandais . . . . .	2
1070	Kiil, E. . . . .	Chemins de fer de l'Etat norvégien . . . . .	4
1091	Kjaer, K. M. . . . .	Chemin de fer privé d'Aalborg (Danemark)	2
1256	Koch, W. . . . .	Deutsche Bundesbahn . . . . .	2
1252	Körner, R. . . . .	Deutsche Bundesbahn . . . . .	2
1063	Kradolfer, P. . . . .	Chemins de fer fédéraux suisses . . . . .	2, 3
1258	Kreidler, E. . . . .	Deutsche Bundesbahn . . . . .	1, 3, 4
23	Laloni, N. (Dr. Prof.) . . . . .	Commission permanente de l'Association, Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
1053	Lalou, P. . . . .	Railways économiques de Liège-Seraing et Extensions (Belgique) . . . . .	4, 5
19	Lamalle, U. . . . .	Commission Permanente de l'Association Internationale du Congrès des Chemins de fer . . . . .	1 to 5
331	Lamarque, A. . . . .	Société Nationale des Chemins de fer fran- çais . . . . .	1, 3
1104	Lamb, D. R. . . . .	British Railways . . . . .	2, 3, 4
1125	Lancrenon, J. . . . .	Chemin de fer de Damas-Hama et prolon- gements . . . . .	3
1044	Landin, C. A. . . . .	Chemin fer de Stockholm-Roslag . . . . .	1
106	Lasz, G. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
1025	Leclerc du Sablon, J. . . . .	Compagnie du Chemin de fer Franco- éthiopien de Djibouti à Addis-Abeba. . . . .	1, 3, 4, 5
329	Leduc, O. . . . .	Société Nationale des Chemins de fer fran- çais . . . . .	1, 3
1186	Lelarge, L. . . . .	Société Nationale des Chemins de fer belges . . . . .	1 to 5
30	Lemaire, M. . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer fran- çais . . . . .	1, 3, 4, 5
339	Lenfant . . . . .	Société Nationale des Chemins de fer belges (Secrétaire principal) . . . . .	4
1212	Lennes, J. N. . . . .	Chemins de fer de l'Etat de Finlande. . . . .	3, 4
617	Levi, G. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	2
33	Lévi, R.. . . . .	Comission permanente de l'Association et Société Nationale des Chemins de fer français . . . . .	1
1209	Lévy, A. . . . .	Compagnie Générale de Voies ferrées d'in- térêt local (France). . . . .	2, 4, 5
46	Lindenberg, G. . . . .	South African Railways and Harbours. . . . .	...

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102	<b>Lo Cigno, E. (Dr. Ing.) . . .</b>	Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'Organisation . . . . .	
343	<b>Loquet, E. F. . . . .</b>	Société Nationale des Chemins de fer belges.	2
1084	<b>Louvel, P. F. . . . .</b>	Chemin de fer de Gafsa (Tunisie) . . .	1, 2, 3
10	<b>Lucchini, C. . . . .</b>	Commission permanente de l'Association et Chemins de fer fédéraux suisses. . . . .	2, 3
1009	<b>Lundqvist, H. . . . .</b>	Union des Chemins de fer privés suédois .	1, 2
314	<b>Lynes, L. . . . .</b>	British Railways . . . . .	2
1147	<b>Maas Geesteranus, E. . . . .</b>	Chemins de fer néerlandais . . . . .	1, 3, 5
1011	<b>Maccallini, L. (Dr. Ing.) . . .</b>	Compagnia delle Ferrovie Danubio-Sava-Adriatico . . . . .	3
1126	<b>Machado Vaz, J. A. . . . .</b>	Compagnie des Chemins de fer portugais .	2, 3, 5
1261	<b>Magdy, Mahmoud . . . . .</b>	Egyptian State Railways . . . . .	2, 3, 5
36	<b>Malderez, M. . . . .</b>	Commission permanente de l'Association et Ministère des Communications (Belgique)	...
213	<b>Malintoppi, E. (On. Avv.) . . .</b>	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
1016	<b>Malmquist, H. . . . .</b>	Chemin de fer de Nora-Bergslag (Suède) .	3, 4
1247	<b>Manitto Torres, C. . . . .</b>	Compagnie des Chemins de fer du Benguela	3, 4, 5
332	<b>Marchand, M.. . . . .</b>	Société Nationale des Chemins de fer français . . . . .	1, 3
1287	<b>Marchini, E.. . . . .</b>	Azienda Tranviaria Municipale, Milano .	5
1120	<b>Margot-Noblemaire, R. . . . .</b>	Compagnie Internationale des Wagons-Lits et des Grands Express européens . . .	2, 3
303	<b>Marguerat, L. . . . .</b>	Chemins de fer fédéraux suisses . . . . .	1
22	<b>Marin, F. (Dr. Ing.) . . . . .</b>	Commission permanente de l'Association, Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
344	<b>Marois, P. . . . .</b>	Société Nationale des Chemins de fer français . . . . .	...
320	<b>Martinelli, M. (Dr. Ing.) . . .</b>	Chemins de fer de l'Etat italien . . . . .	2
205	<b>Martino, E. A. (On. Prof.) . . .</b>	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
1217	<b>Masseron, J. . . . .</b>	Compagnie Fermière des Chemins de fer tunisiens . . . . .	1, 5
119	<b>Massimo Lancellotti, (S. E. le Prince Dr. Don F.) . . .</b>	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
203	<b>Mattarella, B. (On. Avv.) . . .</b>	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
11	<b>Meile, W. (Dr.) . . . . .</b>	Commission permanente de l'Association Internationale du Congrès des Chemins de fer . . . . .	4
1196	<b>Mellissinos, C. . . . .</b>	Chemins de fer Pirée-Athènes-Péloponèse (Grèce) . . . . .	4
1221	<b>de Espregueira Mendes, R. . . . .</b>	Compagnie des Chemins de fer portugais	2, 3, 5
114	<b>Mene, A. (Dr. Ing.) . . . . .</b>	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...

Number.	NAME.	DELEGATED BY	SECTIONS.
1039	Menestret, H. . . . .	Chemin de fer du Bas-Congo au Katanga (Congo belge) . . . . .	4
930	Milko, S. (Ing.) . . . . .	Ministère des Communications de Yougoslavie . . . . .	3, 4
1286	Milone, F. (Dr.) . . . . .	Chemins de fer de l'Etat italien . . . . .	...
1214	Moreau-Defarges, J. . . . .	Compagnie Fermière des Chemins de fer tunisiens . . . . .	3, 4
1270	Moreno Uribe, A. . . . .	Réseau National des Chemins de fer espagnols . . . . .	2, 3
124	Morganti, A. (Avv.) . . . . .	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
920	Morissey, D. . . . .	Ministry for Industry and Commerce (Ireland) . . . . .	4
129	Mosti, G. (Dr.) . . . . .	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
1187	Moulart, G. . . . .	Société Nationale des Chemins de fer belges . . . . .	1, 2, 3
1061	Musquar, J. P. . . . .	Société Nationale des Chemins de fer luxembourgeois . . . . .	2, 3
1194	Narvala, N. G. . . . .	Chemins de fer de l'Etat de Finlande . . . . .	3, 4
908	Nelgard, A.. . . . .	Ministère des Communications (Suède) . . . . .	2, 3
1008	Nerell, A.. . . . .	Union des Chemins de fer privés suédois . . . . .	2, 4
220	Neri, F. (Dr. Ing. Prof.) . . . . .	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
1097	Ness, J.. . . . .	British Railways . . . . .	1, 2, 3
1049	Neumann, S. . . . .	Chemin de fer de la Fionie Méridionale (Danemark) . . . . .	2, 3, 5
39	Nolet de Brauwere van Steeland, P. . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer belges . . . . .	4
1124	Novarese, L.. . . . .	Compagnie Internationale des Wagons-Lits et des Grands Express européens . . . . .	2, 3, 4
1291	Oçman, K. . . . .	Chemins de fer et Ports de l'Etat turc . . . . .	2
326	Olivier, A. W. . . . .	Chemins de fer néerlandais . . . . .	5
109	Onesti, L. (Dr. Ing.). . . . .	Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
1130	Orlandini, E. (Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	1
1249	Ottmann, K. (Dr.) . . . . .	Deutsche Bundesbahn . . . . .	4
1262	Ottone, L. (Comm. Avv.) . . . . .	Società Nazionale di Ferrovie e Tramvie (Italie). . . . .	1, 2, 3
35	Pader, G.. . . . .	Commission permanente de l'Association et Union Internationale des Chemins de fer . . . . .	2, 3, 4
1227	Palmieri, G. C. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	3
1133	Panicelli, W. . . . .	Chemins de fer de l'Etat italien . . . . .	4
1197	Papalexandrou, G. . . . .	Chemins de fer Pirée-Athènes-Poloponèse (Grèce) . . . . .	...
1106	Parkhouse, S. E. . . . .	British Railways . . . . .	2, 3, 4, 5
1152	Parmantier, A. . . . .	Société Nationale des Chemins de fer français . . . . .	1, 3, 5
1105	Pearson, A. J. . . . .	British Railways . . . . .	2, 4

Number.	NAME.	DELEGATED BY	SECTIONS.
104	Perrone, V. (Dr. Ing.) . . . . .	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
912	Petersen, E. G. . . . .	Ministère des Travaux Publics (Danemark).	2, 4
1170	Pialoux, P. . . . .	Chemins de fer de l'Afrique Occidentale française et du Togo . . . . .	2, 5
1107	Pickford, A. Ch. . . . .	British Railways . . . . .	3, 4
1123	Pillepich, A. . . . .	Compagnie Internationale des Wagons-Lits et des Grands Express européens . . . . .	2
101	Poli, D. . . . .	Compagnie Internationale des Wagons-Lits et des Grands Express européens et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	2, 3, 4
318	Polsoni, G. (Dr. Ing. Prof.) . . . . .	Chemins de fer de l'Etat italien . . . . .	1
917	Prot, M. . . . .	Ministère des Travaux Publics et des Transports (France) . . . . .	2
1181	Protat, P. . . . .	Chemins de fer de l'Indochine. . . . .	1, 3, 4
315	Pugson, E. . . . .	British Railways . . . . .	2
608	Punt, P. E. . . . .	British Railways . . . . .	3
1055	Quetand, H. . . . .	Chemin de fer de la Méditerranée au Niger.	3, 4
1020	Radici, B. (Dr. Ing.) . . . . .	Società Italiana per le Strade Ferrate del Mediterraneo (Italie) . . . . .	2, 3, 5
1213	Raindle, A. C. . . . .	British Railways . . . . .	...
1265	Read, G. S. J. . . . .	New Zealand Government Railways . . . . .	2, 3, 5
217	Rebecchini, S. (Prof. Ing.) . . . . .	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
1254	Recker, E. (Dr. Ing.) . . . . .	Deutsche Bundesbahn . . . . .	1, 3
1259	Rehberger, G. . . . .	Deutsche Bundesbahn . . . . .	1, 2, 3, 4, 5,
1002	Remy, X. . . . .	Chemins de fer Fribourgeois . . . . .	2, 5
319	Renda, B. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	1
1090	Rendbeck, G. C. . . . .	Chemin de fer privé d'Aalborg (Danemark)	...
1168	Renouf, A. . . . .	Chemins de fer de l'Afrique Occidentale française et du Togo . . . . .	...
1046	Riboud, P. . . . .	Compagnie des Chemins de fer secondaires du Nord-Est (France). . . . .	1
1024	Richelot, Ch. . . . .	Office d'Exploitation des Transports coloniaux « OTRACO » (Belgique) . . . . .	1, 2, 5
1129	Riggio, A. (Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	1
324	Righi, R. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	3
306	Ripert, L. . . . .	Société Générale des Chemins de fer Economiques (France) . . . . .	1, 2, 5
50	Rivero de Aguilar, J. M. . . . .	Commission permanente de l'Association et Réseau National des Chemins de fer espagnols . . . . .	2, 3, 4
126	Robert, G. (Dr. Ing.) . . . . .	Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
222	Romani, P. (On.) . . . . .	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
1190	Roos, H. . . . .	Chemins de fer de l'Etat de Finlande. . . . .	3, 4
1021	Rosati, R. (Dr. Ing.) . . . . .	Società Italiana per le Strade Ferrate del Mediterraneo (Italie) . . . . .	1, 2, 5
1141	Roscioni, E. . . . .	Chemins de fer de l'Etat italien . . . . .	5
316	Rostern, E. W. . . . .	British Railways . . . . .	3

Number.	NAME.	DELEGATED BY	SECTIONS.
1183	Rousseau, P. A. . . . .	Union Internationale des Chemins de fer.	1, 2, 3
1026	Rousset, M. . . . .	Compagnie du Chemin de fer franco-éthiopien de Djibouti à Addis-Abeba. . . . .	2, 4, 5
1269	Rubio, R. . . . .	Réseau National des Chemins de fer espagnols . . . . .	2, 3, 4
1108	Rudgard, H. . . . .	British Railways . . . . .	2, 3, 5
1264	Sales Lane, . . . . .	Chemins de fer de l'Etat dans les Colonies portugaises. . . . .	..
1243	Samardzis, J. . . . .	Chemins de fer de l'Etat hellénique . . . . .	1, 3, 5
1109	Sandeman, W. Y. . . . .	British Railways . . . . .	1
1033	Sanders, J. O. . . . .	Malayan Railways . . . . .	3, 4, 5
1034	Sanderson, B. . . . .	Malayan Railways . . . . .	2, 3, 4
123	Santoni Rugiu, G. (Dr.) . . . . .	Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	..
1134	Santoro, F. . . . .	Chemins de fer de l'Etat italien . . . . .	4
1257	Sasse, H. W. (Dr. Ing.) . . . . .	Deutsche Bundesbahn . . . . .	1, 3, 5
1087	Schmidt, C. J. . . . .	Chemin de fer Stockholm-Roslag (Suède). . . . .	1, 2
1092	Seidler, E. (Dr.) . . . . .	Chemins de fer fédéraux autrichiens . . . . .	2, 3, 4
1027	Sergent, G. . . . .	Compagnie du Chemin de fer franco-éthiopien de Djibouti à Addis-Abeba. . . . .	1, 2, 5
1036	Severijns, J. . . . .	Chemin de fer du Bas-Congo au Katanga (Congo belge) . . . . .	1
921	Shanagher. . . . .	Ministry of Industry and Commerce (Ireland) . . . . .	..
1100	Sherrington, C. E. R. . . . .	British Railways . . . . .	..
1289	Siganos, N. . . . .	Ministère des Transports (Grèce) . . . . .	..
1250	Singelmann, W. . . . .	Deutsche Bundesbahn. . . . .	4
307	Sjöberg, E. A. . . . .	Chemins de fer de l'Etat suédois . . . . .	4
1229	Sparrow, H. . . . .	Pakistan Government (North Western Railways) . . . . .	..
1189	Squilbin, R. . . . .	Société Nationale des Chemins de fer belges . . . . .	2
47	Steiner, F. . . . .	Commission permanente de l'Association et Département des Postes et des Chemins fer (Suisse) . . . . .	*
1137	Strocchi, F. (Dr. Ing.) . . . . .	Chemins de fer de l'Etat italien . . . . .	2, 5
605	Surleau, R. . . . .	Société Nationale des Chemins de fer français . . . . .	5
1175	Surleau, F. . . . .	Chemins de fer de Madagascar . . . . .	3, 5
214	Tambroni, F. (On. Avv.) . . . . .	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	..
347	Tapia, J. . . . .	Réseau National des Chemins de fer espagnols . . . . .	2
1136	Tenti, E. (Ing.) . . . . .	Chemins de fer de l'Etat italien. . . . .	1, 3
42	Terkelsen, E. D. F. . . . .	Commission permanente de l'Association et Ministère des Travaux Publics (Danemark) . . . . .	3, 4
414	Thomas, C. . . . .	Société Nationale des Chemins de fer français . . . . .	..
302	Thomas, P. A. . . . .	Société Nationale des Chemins de fer vicinaux (Belgique) . . . . .	..
1071	Thomseth, J. . . . .	Chemins de fer de l'Etat norvégien . . . . .	2
924	Thorneycroft, G. B. . . . .	Ministry of Transport (Great Britain) . . . . .	4

Number.	NAME.	DELEGATED BY.	SECTIONS.
1006	Tiemroth, H. . . . .	Chemin de fer de Lolland-Falster (Dane-mark)	4
618	Tilli, F. (Dr.) . . . . .	Chemins de fer de l'Etat italien . . . . .	3
1001	Tissier, M. . . . .	Chemins de fer Economiques du Nord (France). . . . .	2, 5
904	Torres-Quevedo, G. . . . .	Ministère du Fomento (Espagne) . . . . .	1
18	Train, J. C. L. . . . .	Permanent Commission of the Association and British Railways . . . . .	1, 3, 5
1067	Tribelhorn, W. . . . .	Chemins de fer fédéraux suisses . . . . .	3
1263	Tribot-Laspierre, G. . . . .	Compagnie Internationale des Wagons-Lits et des Grands Express européens . . . . .	...
216	Trichero, M. (Dr.) . . . . .	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
1182	Tuja, J. . . . .	Union Internationale des Chemins de fer . . . . .	2, 3, 4
902	Turell, F. . . . .	Ministère du Fomento (Espagne) . . . . .	3, 4, 5
1089	Turell, G. . . . .	Compagnie Générale des Chemins de fer catalans (Espagne) . . . . .	1, 5
601	Unal . . . . .	Société Nationale des Chemins de fer français . . . . .	1
13	Üpmark, E. G. J. . . . .	Commission permanente de l'Association et Chemins de fer de l'Etat suédois . . . . .	4, 5
337	Uytborck, F. . . . .	Secrétariat de l'Association Internationale du Congrès des Chemins de fer . . . . .	2
122	Valdivieso, M. (Dr. Ing.). . . . .	Chemins de fer de l'Etat italien et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
41	Vanderborght, J. . . . .	Commission permanente de l'Association et Société Nationale des Chemins de fer belges. . . . .	1, 2, 3
906	Van Galen Last, H. . . . .	Ministère des Transports et du Waterstaat (Pays-Bas) . . . . .	1, 3, 4
1060	Van Lierde, F. . . . .	Société Nationale des Chemins de fer vicinaux (Belgique) (Secrétaire principal) . . . . .	2, 4, 5
1040	Van Mulders, M. . . . .	Chemin de fer du Bas-Congo au Katanga (Congo belge) . . . . .	1
341	Van Rijn, J. . . . .	Société Nationale des Chemins de fer belges . . . . .	1
127	Vanzi, I. (Ing.) . . . . .	Federazione Nazionale Impresi Trasporti et Comité Exécutif de la Commission locale italienne d'organisation . . . . .	...
1191	Varanki, L. M. . . . .	Chemins de fer de l'Etat de Finlande . . . . .	1, 3, 5
1193	Varjonen, U. M. . . . .	Chemins de fer de l'Etat de Finlande . . . . .	3, 4
1232	Varma, B. B. . . . .	Railway Board, India . . . . .	1, 3, 4
406	Velleman, A. (Prof.) . . . . .	Secrétariat de l'Association Internationale du Congrès des Chemins de fer . . . . .	...
1140	Vezzani, F. . . . .	Chemins de fer de l'Etat italien . . . . .	5
926	Videt Yontrakich, L. . . . .	Gouvernement de Thaïlande . . . . .	...
1047	Vincent, R. . . . .	Compagnie des Chemins de fer secondaires du Nord-Est (France) . . . . .	5
51	Villamil, F. . . . .	Commission permanente de l'Association et Réseau National des Chemins de fer espagnols . . . . .	1 to 4

Number.	NAME.	DELEGATED BY	SECTIONS.
208	<b>Vischia, C.</b> (On. Avv.) . . .	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
215	<b>Visentini, M.</b> (Dr. Ing. Prof.).	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...
338	<b>Voordecker, E.</b> . . . . .	Société Nationale des Chemins de fer belges (Secrétaire principal) . . . . .	3
909	<b>Vrebos, J.</b> . . . . .	Ministère des Communications (Belgique).	1, 2, 3, 5
301	<b>Vrielynck, W. A.</b> . . . . .	Société Nationale des Chemins de fer vicinaux (Belgique) . . . . .	2, 4, 5
1064	<b>Wachs, W.</b> . . . . .	Chemins de fer fédéraux suisses . . . . .	2
48	<b>Wahid, Bey</b> (Dr. Sayed Abdel)	Commission permanente de l'Association et Chemins de fer de l'Etat égyptien . . . . .	1, 3, 4
1068	<b>Wanner, F.</b> . . . . .	Chemins de fer fédéraux suisses . . . . .	4
1142	<b>Wansink, D. J.</b> (Dr.) . . . . .	Chemins de fer néerlandais . . . . .	...
1111	<b>Warder, S. B.</b> . . . . .	British Railways . . . . .	2
317	<b>Watkins, J. W.</b> . . . . .	British Railways . . . . .	1, 3, 5
334	<b>Weberg, O. G.</b> . . . . .	Chemins de fer de l'Etat danois . . . . .	2
1062	<b>Wehenkel, A.</b> . . . . .	Société Nationale des Chemins de fer luxembourgeois . . . . .	1, 4
1012	<b>Weissel, A.</b> (Dr.) . . . . .	Compania della Ferrovie Danubio-Sava-Adriatico . . . . .	4
100	<b>Whitworth, Ch. E.</b> . . . . .	British Railways . . . . .	...
1065	<b>Wichser, O.</b> . . . . .	Chemins de fer fédéraux suisses . . . . .	1, 3
923	<b>Wilson, G. R.</b> (Lt. Col.) . . . . .	Ministry of Transport (Great Britain). . . . .	1, 2, 3, 5
907	<b>Winberg, H.</b> . . . . .	Ministère des Communications (Suède). . . . .	3, 4
1210	<b>Ytasse, E.</b> . . . . .	Compagnie Générale de Voies ferrées d'Intérêt local (France). . . . .	3, 4, 5
211	<b>Ziino, V.</b> (On. Dr.) . . . . .	Comité d'Honneur de la Commission locale italienne d'organisation . . . . .	...

# OPENING CEREMONY OF THE XVth SESSION

September 25th, 1950, at 4.30 p.m.

The inaugural meeting of the 15th Session took place in the great Auditorium of the ROME UNIVERSITY, of which numerous vast rooms had been placed at the disposal of the organisers of the Rome Congress. The hall was profusely decorated with flowers and the flags of the participating nations.

Approximately 500 delegates, together with their ladies, were present at the ceremony, which was held in the presence of Signor DE GASPERI, Prime Minister, several Ministers and Under-Secretaries, as well as many other leading figures in the parliamentary life of Italy.

His Excellency On. Lodovico d'ARAGONA, Minister of Transport of the Italian Republic, Signor G. di RAIMONDO, General Manager of the Italian State Railways and Mr. F. H. DELORY, General Manager of the Belgian National Railways and President of the International Railway Congress Association, were on the platform.

They were surrounded by :

Mr. J. M. GOURLAT, Director, Northern Region, French National Railways; Vice-President of the Permanent Commission of the Association;

Lord HURCOMB, Chairman of the British Transport Commission; member of the Executive Committee of the Permanent Commission of the Association;

Sir Gilmour JENKINS, Secretary to

Minister of Transport (Great Britain); member of the Executive Committee of the Permanent Commission of the Association;

Mr. P. GHILAIN, Director of the Locomotives, Rolling Stock and Purchase Department, Belgian National Railways, Vice-President and General Secretary of the Permanent Commission of the Association;

Dr. Eng. M. VALDIVIESO, Inspector in chief, Staff and General Affairs Department, Italian State Railways, Secretary of the Italian Executive Committee of organisation.

Many members of the Permanent Commission were also present on the platform.

His Excellency On. Lodovico d'ARAGONA, Minister of Transport and President of the Honorary Committee of the Italian Local Organizing Commission, welcomed the Delegates as follows :

« MR. THE PRIME MINISTER,  
« EXCELLENCIES,  
« LADIES,  
« GENTLEMEN,

« In the name of the Government of the Republic of Italy and as President of the Honorary Committee of the Congress, I wish to welcome you all most cordially, Delegates of the different

## Governments and Railway Administrations to the XVth Session of the International Railway Congress Association.

« It is with particular pleasure that the Italian Government sees you collected together here in Rome, on such a solemn occasion, and it is the third time that my country has had the great honour of welcoming this Congress. In effect, the first time was at Milan in 1887, on the occasion of the IIInd Session, and the second time in 1922 in this same city for the IXth Session. 28 years have already passed since your last meeting in Italy, and during this period a great many events have occurred which have profoundly altered the political situation in Europe and the World.

« In 1922, it was also a troubled post-war period, characterised by disorders and social troubles due to the aspirations and legitimate requirements of the disinherited classes who had long suffered oppression, and consequently there was a serious reaction in Italy and then in many other countries. During these 28 years, we have seen this merciless reaction evolve into tyranny and we have assisted at its utter defeat after the long war it forced upon humanity. Out of the ashes and the ruins, the heritage of dictatorship, we have seen the material and spiritual reconstruction of countries tormented by tyranny and war.

« Today as in 1922, you are meeting here in Rome at a time rich in history, when the fires are still smouldering on the horizon, and humanity, still licking its wounds after the recent conflict, is weighed down by new menaces and aspirations.

« But now, unlike then, this humanity has a deep seated knowledge, developed during the long ages that have gone by, a knowledge that Peace can be and must be safeguarded by Liberty alone and by means of international co-operation, since a further conflict would risk inflicting a mortal blow to our civilisation.

« Now, you, the railwaymen of all the different countries, you are truly the soldiers and standard-bearers of this peace and this international co-operation. You form in fact a single large family, whose mission and labours know neither frontiers nor barriers. The railway unites you all and makes possible the fraternisation of mankind; it encourages an ever closer bond and thanks to liberty of communications achieves the union of all the peoples of the world.

« This is the reason why the Italian Government, which freely desires to share in the work of reconstruction of its country, greets you with great joy in this city of Rome, the universal and eternal city, and expresses its very sincere wishes for the success of your Congress and your works.

« The marvellous evolution which has taken place during the last years in methods of transport and systems of traffic has set problems that previously did not exist for all the railways of the world.

« This evolution has deprived the railways of the undisputed monopoly which they enjoyed until recently and has imposed upon them a revision of their policy, which must of necessity be directed towards a serene vision of the present day realities and the future of civilisa-

tion; at this present Congress, after careful and conscientious preparation, you are going to study these problems. I think it would be superfluous to tell you that the results of your enquiries, whether in the purely technical field, or in the social and economic ones, are awaited with the greatest interest by all Railway Administrations and by all those whose work is concerned with the very complex and vital matter of transport.

« All of you can be certain that your works are extremely important as much : from the economic point of view as the political; that these works aim at realising the perfecting and development of railway communications, and that in the end they tend towards the improvement of relations between nations and the fraternity of mankind, as well as the strengthening of peace and civil liberties.

« May this certainty be your guide and your consolation in your works as it is in your daily activities.

« This is the ardent wish which I desire to express to you and the Congress in the name of the Italian Government. » (*Long applause.*)

**Mr. F. H. DELORY, President of the Permanent Commission replied as follows :**

« MR. PRESIDENT OF THE SENATE,  
 « MR. PRESIDENT OF THE CHAMBER OF DEPUTIES,  
 « MR. PRESIDENT OF THE COUNSEL OF MINISTERS,  
 « YOUR EXCELLENCY THE MINISTER OF TRANSPORT,  
 « YOUR EXCELLENCIES,

« LADIES AND GENTLEMEN,

« I have the great honour to record in the name of the 500 delegates to the XVth Session of the International Railway Congress Association our deep appreciation of the honour paid us by your presence at this solemn opening meeting.

« I must ask you to convey our thanks also to the President of the Republic, who unfortunately on account of other duties is unable to be present at the opening meeting of the Congress.

« The presence of eminent representatives of the Italian Government constitutes the highest mark of esteem which our Association could receive in recognition of its endeavours. It also proves that Italy, zealous of keeping in the forefront of progress, has a great interest in all questions relating to the railways.

« MESSRS PRESIDENTS OF THE LEGISLATIVE CHAMBERS,

« MR. THE PRIME MINISTER,

« YOUR EXCELLENCIES,

« LADIES AND GENTLEMEN,

« I wish to thank the Minister of Transport very sincerely for the kind words of welcome he addressed to us, by which we were profoundly touched.

« From the very first contacts which we had with the local Italian Commission, we were able to appreciate both the kindness of its hospitality and the efficiency of its organisation.

« All the delegates are very fortunate in being able to visit this famous and magnificent city of Rome on the great

occasion of the Holy Year, and they wish me to express their thanks on their behalf.

« The participation of the foremost railway experts in our works is a guarantee that this Session — like those that preceded it — has decided to find a solution to the difficulties which most Railways find themselves up against.

« During its existence of more than 65 years, our Association has endeavoured to perfect railway science. Is it necessary to recall that it was in 1885 that our Association was set up during a scientific Congress meeting to celebrate the 50th anniversary of the creation of the first railway.

« Is it necessary to remind you that our Association includes 34 Governments and 113 Railway Administrations corresponding to the impressive figure of 456 000 km (315 000 miles) of lines.

« The activities of the International Association have found a concrete expression in the organisation of 15 Congresses and 3 meetings of the Enlarged Permanent Commission held with various objects in different parts of the world.

« First of all there was the period of growth and enthusiasm during the peace and security of an actual monopoly.

« This was the period of technical progress and enormous industrial development in which the railway played a primordial part.

« Then competition put in an appearance, the inevitable accompaniment of human progress.

« Finally we come to the period of the present day difficulties with which you are all familiar.

« To judge of the vitality of our Association, it is only necessary to recall the enthusiasm with which the Lucerne Congress was organised. We had just come through a terrible crisis. And how successful it proved in spite of the immense difficulties of the time.

« The Meeting of the Permanent Commission held at Lisbon in 1949 was strikingly successful.

« Railwaymen have always been filled with confidence in the destiny of their calling.

« Let us consider the great services rendered throughout the world by the railways in the transport of people and goods.

« Let us think of the immense capital invested in the railways which is an essential part of the national wealth.

« Let us remember the innumerable army of railwaymen carrying out this mission of progress and civilisation.

« Doubtless scientific, technical and social evolution will give rise to new problems, and sometimes to very difficult ones.

« Doubtless, railwaymen will have to adapt themselves to new demands, and new methods.

« There is not one of them who would dream of denying the necessity for following the progress made in the technique of transport.

« They are convinced that other methods of transport, the road, the waterways and the air, also have their place in modern civilisation. But, they are also convinced of the mission which they themselves have to fulfil; and they

are determined to find adequate solutions. There is not much of a margin; they know that new and unavoidable principles concerning the cost and quality of the service are at the base of all their actions. They understand that they will have to prove their ingenuity, boldness and perseverance in order to provide transport under economic conditions, whilst satisfying their clients in every way.

« In the case of passenger traffic, the fundamental conditions to be fulfilled are safety, regularity, comfort and speed. The considerable progress made in railway technique during the last few years enables the railway to look forward to the future with confidence.

« As for the goods traffic, it also has seen its field of action enlarged by the creation of services enabling the ideal technique of door-to-door transport to be achieved.

« I cannot repeat too often how much the railways need the collaboration of each and everyone to conquer and retain the position to which they are entitled.

« It is truly this spirit of confraternity that is one of the characteristics of the international relations between railwaymen, and I am happy to note that the Permanent Commission of the Association has only included in the agenda of this Session essential questions, the deciding of which will form a basis for the improvement of our services.

« We are well aware of the fact that in order to achieve our object, in addition to technical progress, we must reserve a place of equal importance for questions relating to financial matters

and social evolution directly affecting the well being of the staff.

« Reading through the list of questions which are to be discussed, you will have noted that they cover a very extensive field; they are all extremely topical and deal with characteristic points concerned with the fundamental working of the railway :

« — modern tendencies in the building of railway structures, especially bridges; the results obtained in the construction of railway bridges in reinforced concrete. Future prospects for the use of prestressed concrete.

« — modernisation of permanent way maintenance methods on secondary railways;

« — the comfort of passengers in coaches, railcars and rail motor coaches;

« — the construction and organisation of large marshalling yards;

« — methods likely to keep the full load traffic on the railway;

« — the preparation of financial balance sheets for the passenger and goods services, based on a study of the prime cost of trains, per category, per line and per type of motive power;

« — the organisation and development of medical and social services with partnership of the staff in their management.

« The study of these problems has been the subject of copious documentation contained in reports of real value.

« The Permanent Commission selected experienced and particularly competent reporters.

« In the name of the Commission, I

wish to thank them for their invaluable collaboration.

“ LADIES,

“ GENTLEMEN,

“ We now have to set up the Bureau of the Session :

“ M. d'ARAGONA, the Minister of Transport, has been good enough to agree to accept the Honorary Presidency of the Congress.

“ M. MATTARELLA, Member of Parliament and M. BATTISTA, Senator of the Republic have graciously consented to act as Honorary Vice-Presidents.

“ For the President of the Session, I am sure I can count upon your unanimous vote for M. G. DI RAIMONDO, General Manager of the Italian State Railways, whose dynamic personality and great competence are well known throughout railway circles and constitute a guarantee of the successful outcome of our works.

“ For the Vice-Presidents, the selection of outstanding Italian railwaymen also would seem indicated, and I propose the names of Messrs MARIN and Lo CIGNO, both of whom are Assistant General Managers of the Italian State Railways. (*Applause.*)

“ With the faith in the future of the railway, which we expressed a moment ago, we are absolutely convinced that the works of the Rome Session will be a powerful contribution towards it, and that this Congress will be an unprecedented success. ” (*Prolonged applause.*)

**M. G. di RAIMONDO, General Manager of the Italian State Railways and President of the Session, then delivered the following speech :**

“ YOUR EXCELLENCIES,

“ LADIES,

“ GENTLEMEN,

“ During its meeting on the 4th December 1948, the Permanent Commission of our Association unanimously expressed a wish for the XVth Congress to be held in Italy.

“ The Italian Government, appreciating the value of this decision, at once agreed to the wishes of the Commission with the greatest enthusiasm.

“ At the beginning of our labours, may I once more thank our eminent President M. DELORY and all our Colleagues of the Permanent Commission for the great honour paid us.

“ My country is proud and happy to offer you hospitality in this eternal city, the cradle of civilisation and the centre of Christianity.

“ The Minister of Transport, who has always followed with sympathy and the greatest interest the life of the Association, has welcomed you in the name of the Italian Government and People.

“ I must add that the greetings of our Minister will be echoed well beyond the walls of this austere hall in which you have been received. Thousands of Italian railwaymen are present here in spirit and offer you, through me, their respectful greetings; they offer you the spontaneous homage of their feelings of fraternity and sincere solidarity. They



Opening Ceremony of the XVth Congress at Rome University.  
Mr. di Raimondo, General Manager of the Italian State Railways, delivering his speech.



sincerely wish you a very happy sojourn and hope that at the end of the Congress you will carry away in your memory a lasting and agreeable impression of Italy, not only of a beautiful, kind, gay and charming country by reason of her natural and artistic merits, but also and above all of a country entirely given over to a gigantic effort to resurrect herself and find a material and spirit rebirth from the abyss into which the war had thrown her.

« This is the third time that the Association has held a Congress in Italy. The first time was at Milan in 1887 and the Statutes of the Association were approved at that Session, in other words its birth was officially recognised.

« On the second occasion, the Congress was held in Rome, in 1922, the first official meeting after the first world war. On this occasion, the Association was officially reconstituted after its dissolution and liquidation on account of political events. It seems that Italy is closely bound up with the life of the Association.

« On the present occasion luckily, there is no question of the existence of the Association which is stable and prosperous, but rather of intensifying its work after the first post-war meeting which took place at Lucerne in 1947.

« Each of the Sessions of the Congress has marked a definite stage forward in the technique and economy of railway transport. The reports and results of the discussions have always proved an authoritative guide in solving railway problems, the field of which is extraordinarily vast because it covers all the

technical, economic, political and social sides.

« Although the Lucerne Session of 1947, the agreeable echoes of which have not yet died down, was the first affecting and cordial resumption of contacts after the tragedy of the war, this Rome Session is particularly important on account of the quantity and quality of the problems which are to be dealt with.

« Your discussions, your conclusions, in addition to guiding railwaymen in the path of progress, will also serve to open the eyes of the public to the ever vital and topical importance of the railway.

« In this time of transition, evolution and deep seated maturing of vast social problems, some peoples are tempted to think that the railway has had its day and should in future give place to more modern and up-to-date methods of transport.

« If it were really true that the railways are out-dated, I believe that you, gentlemen, illustrious railway experts as you are, with the disinterested objectivity that is one of your characteristics, would be the first to recognise the fact.

« In reality the importance of the railway from no matter what aspect it is considered is still, in spite of all the arguments and discussions put forward, still insufficiently recognised and valued. In nearly every case all railway transport undertakings are merely considered from two aspects, the technical one and the economic one, which are closely linked together and yet independent of each other.

« By means of new inventions, suggested by science and experience, tech-

nical progress endeavours to modernise the tools to make the work easier to carry out, the traffic organisation endeavours to profit by inventions and technical improvements, to the fixed equipment as well as to the rolling stock, to select the indispensable elements to perfect the organisation and working of the undertaking, thus making the transport economically more profitable in the interests of the users and the national economy.

« However, to get a clearer grasp of this complex problem it is not sufficient merely to consider a system of rail transport solely from the two points mentioned just now: technical and economical; there are two other aspects of the problem which are not less important and interesting, and it should be considered from the social aspect and the political aspect also.

« If the problem is examined under all these various aspects, without exception, the conclusions arrived at will be very different.

« It is necessary in fact to remember that in nearly every country railway transport, directly operated by the State, is organised according to two principles: *industrial management*, with autonomous administration — in most cases merely nominal — closely linked with the exigencies of a *public service*, subject to all the obligations and burdens which the State sees fit to impose for its own particular political ends and specific social characteristics.

« In the case of a Railway Administration the combination of these two characteristics, that is to say administrative

autonomy and public service, which lead not only to contracts in principle and to difficulties in the organisation and functioning of the Administration itself, stultify the efforts, both in the technical field and in the field of organising the traffic, of the management to reduce operating costs and make the transport more economical.

« Is it possible, is it opportune, is it advisable for the State to give up the advantages entailed in the direct management of their own transport undertaking by rail for the whole community and the national economy, in the widest meaning of the phrase ?

« Personally I do not think so, and I might even be mistaken.

« In the social and political fields, the State must of necessity impose burdens on the organisation and operation of its railway administration, in order to assist the poorest classes, the classes who have the greatest need of assistance, transporting such categories of persons nearly or completely free, since in the complex workings of its administrative organisation they have their special tasks to fulfil.

« The State also must of necessity intervene by its legislation and regulations to adjust the cost of transport so that it will affect the cost of living in general as little as possible.

« Again the State by its rating policy is bound to favour the industrial and agricultural products of its own country to enable them to flow towards the consuming centres, both at home and abroad.

« The State finally must never over-

look the very important part the railways would have to play in the case of unavoidable war, to assure the integrity of the country, the defence of its inheritance of civilisation and its democratic institutions, freely chosen and supported.

« And if the functions which a State undertaking has to carry out in the political and social fields are unavoidable, it is very clear that its balance sheet will of necessity be burdened by the passive charges such functions inevitably impose.

« In this connection, I will give you certain details concerning the Administration I have the honour to manage.

« On the Italian State Railway system, there are lines or sections of lines in existence and partially restored whose operation, at least at the present time, certainly shows a deficit. From a strictly economic point of view, they should have been given up and replaced by other methods of transport which cost less to run. However social or political reasons made it clear that it was useful and even from certain points of view essential to maintain railway communication with places or regions that are backward economically or isolated.

« On the Italian system, such lines amount to 40 % of the total length, and the burden carried by the Administration for this reason is about 30 % of the total operating costs.

« Naturally, the decision regarding the suppression or keeping, in the whole or in part of such lines is entirely the business of the Government, which is in a position to estimate the advantages and drawbacks which would result.

« In the case of *passenger traffic*,

cheap fares are granted to workmen, students, war disabled, cripples, and many other classes of persons, as well as facilities to encourage tourist traffic, commerce, or for the benefit of cultural, scientific and sporting events.

« The burden imposed on the Administration by all these facilities is about 16 thousand million lire, i. e. nearly 23 % of the passenger traffic receipts.

« *In the case of goods transport*, special rates have been introduced to facilitate the distribution of foodstuffs throughout the country or to favour the export of agricultural produces, appreciably accentuating the differentiation in cost according to the increase in the distance, or to create or develop industry in backward areas, and finally to assure the working of other public services, such as the postal services.

« The burden upon the financial balance sheet of the Administration is about 10 thousand million lire, i. e. nearly 13 % of the total goods traffic receipts.

« To sum up, for social or political reasons, without taking into account the passive burden of operating lines with little traffic, the Administration of the Italian Railways has to support a burden of about 25 thousand million lire in its ordinary balance sheet, which corresponds to nearly 17 % of the total traffic receipts.

« Obviously such reductions in the receipts increase the operating costs which are also increased by the excessive staff, which cannot be reduced for social and political reasons.

« It should not be said, as it often is

both in our country and abroad, that as a result of the above considerations the railways are out of date.

« On the contrary, we are convinced that the railway, far from being on the down grade, is today more vital than ever, not only on account of the services which it renders humanity and its essential functions in times of peace and war in the life of the nation, but also because, may I declare once again on this occasion of the opening of the XVth Session of our Association, there are thousands and thousands of technicians and railwaymen, bound by a common tradition of work, who have consecrated to the railway all their intellectual, moral and spiritual resources, willingly and knowingly.

« But though there are over-riding interests, legitimate and fully justified, which call for sacrifices on the part of the railway management, this does not mean that it is not possible to continue to try and make such management more economic and consequently relieve the burden which the State has to support.

« Railway transport systems are still capable of further improvements and progress.

« The fundamental core of the problem is to reduce the cost price. Here is the main route which must be followed. Here is the result towards which the investigations of the technical experts should tend.

« Since its creation the Association has had these worthy objects in view.

« The innumerable measures adopted in the international field, in conformity with the decisions taken and recommen-

dations made by the Association bear witness to this fact.

« The road to be followed in reaching this goal is neither short nor easy, but doubtless the technicians will be able to overcome all the difficulties and the Governments will be able to find, it is hoped, the necessary funds for a further investment of capital, as well as to improve the means of operation in order to make it more economical and obtain a higher output.

« This is the place to mention one of the most serious post-war problems, that is to say the problem of the competition and co-ordination of road and railway transport.

« But it is not the best moment to go into this question at length in view of its great interest and extreme importance.

« My eminent Colleagues will doubtless have already had to face, and continually study this problem which has not yet been completely solved, at least in most countries.

« Personally I am convinced, and I beg you to note that this is a purely personal point of view, that if the two methods of transport, road and rail, could be worked under absolutely equal conditions as regards the burdens imposed upon them, the problem of competition which has so long been discussed without reaching any rational conclusion up to the present time, would automatically be solved, and the Railway Administrations would then find their natural limits of technical and economic activity without any trouble.

« The co-ordination of the two methods would be spontaneously achiev-

ed in accordance with the laws and fundamental principles of economics, which at all times and in every country have always regulated and always will regulate the activity of the people.

« In the exceptional period immediately after the war when the railways, paralysed by the destruction wrought, were unable to function, road transport, under the impulse of private speculation, developed and grew, perhaps much more than was necessary for the normal requirements of the economic life of the nation.

« Undoubtedly, one of the most serious problems to be solved is to regulate the activity of the different systems of road, maritime and aerial transport in the field of their natural development and within the limits of their most economical working. It is very doubtful if it is possible to compete against private initiative by following this road; but what is indubitable and necessary is that in the domain of overland transport, road transport should be subjected to the same burdens and obligations as those now weighing upon State Railway Administrations.

« As regards the technique of transport, there is no competition between road and rail, just as there is no competition between aerial and maritime navigation.

« Actually, the running resistances in the case of the road, railway, sea and air are altogether different in nature and value.

« Consequently, the problems which technical skill has to investigate and solve are very different for overland, maritime

and aerial transport both in the case of traction and propulsion.

« If we limit our investigations solely to overland transport, railway transport has its special characteristics and advantages as regards speed, security, capacity and economy which cannot be compared with analogous characteristics in the case of road transport.

« There is on the other hand great competition, appreciably increased by the consequences of the last war, between public and private transport. From the technical field, therefore, the problem has passed into the economic field which always makes its solution more difficult.

« What in fact are the economic results which a public transport undertaking, administered in a technically perfect way, may hope to achieve, when private hauliers are allowed to take the cream of the most paying traffic, since they enjoy special privileges ?

« It is impossible to continue the struggle when the economic bases are substantially different, and a policy without discrimination intended to lead to reduced prices, whilst being profitable to the users whom it unfairly enriches, is harmful to those transport undertakings which cannot base their management on equal rights and duties.

At least for the sake of making the budget of the undertaking quite clear it is necessary to show as separate items the costs which State Administrations are obliged to bear for political or social reasons, keeping these apart from the actual economic balance sheet of the undertaking, since these passive burdens are not strictly industrial in character.

« The management, technicians and executive staff can really make a fundamental contribution to the solution of the problem common to all Railway Administrations in this way, that is in connection with the reduction of costs. And it may be claimed that remarkable progress has been made in this direction.

« In the last quarter of a century extraordinary progress has also been made in connection with the fixed equipment, rolling stock, electrification, operating methods, and the organisation of the traffic, as well as in the administrative field and the management of the staff.

« By this means the consumption of fuel and electric current has once again been reduced to satisfactory levels, the average speed of the trains is continually increasing, the comfort of passengers is being more and more catered for, and the maintenance costs are being reduced to reasonable limits.

« The discussions, which you are going to have during this Congress, which is beginning under the most auspicious conditions, should contribute towards these ends.

« EXCELLENCIES,

« LADIES,

« GENTLEMEN,

« M. DELORY, the eminent President of the Permanent Commission of our Association, to whom I wish to address our warmest congratulations and heartfelt thanks for the perfect organisation of the Congress, brought to your notice in his

brilliant speech the most important questions which you are asked to discuss.

« I have no doubt that, thanks to the invaluable and intelligent work of the reporters whom I wish to thank on behalf of the whole Assembly, that you will be able to find in working together the best solution for each question.

« The representatives of the Italian and foreign press who have been good enough to accept the invitation to attend the works of the Congress will be the faithful interpreters of your thoughts, of your works and of your conclusions.

« I am quite sure that by means of their articles and commentaries, public opinion will be objectively enlightened concerning the importance and delicacy of the problems being discussed and the conclusions at which you will arrive.

« It is my duty to offer them our most heartfelt and cordial thanks.

« I also wish to thank Professor CARDINALI, Rector and President of the Faculty of Letters and Philosophy of Rome University, for the aid and assistance he has been good enough to give us in preparing a worthy meeting place for the Congress. (*Applause.*)

« As for you, Ladies, who by the goodness and grace of your persons embellish this Assembly, in the name of all the Italian railwaymen and their families I wish to pay you our most respectful homage and express the wish that you will have a peaceful and happy sojourn in Rome and in the other places you are going to visit.

« MY DEAR FRIENDS AND COLLEAGUES,

« I would not like to end this necessarily brief opening speech without

addressing to you a plea and a wish originating and finding their strength in our common sentiments of fraternity and concord as well as in the unity of the aims which guide us in our daily work.

“ Let us not forget that today, as in the past, as in the future, we all belong to one large family which knows no differences nor barriers of language, use, custom or religion.

“ This is the family of railwaymen in which we are all united by this steel ribbon, the rail.

“ We know that this steel is made of very pure metal. We must defend it, protect it and strengthen it to make sure that it is neither bent nor broken, for the common good of the civilised world and for the peace of the nations. (*Long applause.*)

“ Finally I believe I am interpreting the wishes of the whole Assembly in

proposing to complete the Bureau of the Session by the following appointments :

*“ General Secretaries :*

“ M. P. GHILAIN, Vice-President and General Secretary of the Permanent Commission;

“ Dr. Eng. M. VALDIVIESO, Inspector in Chief, Staff and General Affairs Department, Italian State Railways, Secretary of the Italian Local Organizing Committee.

*“ Assistant General Secretary :*

“ Mr. Ch. E. WHITWORTH, Assistant to Chief Officer (Administration), the Railway Executive, British Railways. ”

— These appointments were received with the unanimous applause of the Delegates.

— The meeting was closed at 5.30 p.m.

# GENERAL BUREAU OF THE XVth SESSION

## Honorary President :

On. Lodovico D'ARAGONA, Ministre des Transports d'Italie.

## Honorary Vice-presidents :

On. Avv. Bernardo MATTARELLA, Député au Parlement, Sous-Secrétaire d'Etat aux Transports.

On. l'Ing. Emilio BATTISTA, Sénateur de la République, Sous-Secrétaire d'Etat aux Transports.

## President :

M. le Dr. Ing. Giovanni DI RAIMONDO, Directeur Général des Chemins de fer de l'Etat italien, membre de la Commission permanente de l'Association.

## Vice-presidents :

Dr. Ing. Ferrucio MARIN, Vice-Directeur Général des Chemins de fer de l'Etat italien, membre de la Commission permanente de l'Association.

Dr. Ing. Ettore LO CIGNO, Vice-Directeur Général des Chemins de fer de l'Etat italien.

## Vice-presidents by privilege (1) :

Austria. — Dr. E. SEIDLER, Directeur Général des Chemins de fer Fédéraux autrichiens.

Belgium. — M. MALDEREZ, Secrétaire Général du Ministère des Communications, membre de la Commission permanente de l'Association.

Denmark. — P. CHRISTENSEN, Secrétaire Général au Ministère des Travaux Publics.

Egypt. — Dr. Sayed Abdel WAHID, Bey, Directeur Général à l'Administration des Chemins de fer, Télégraphes et Téléphones de l'Etat égyptien, membre de la Commission permanente de l'Association.

Spain. — F. TURELL, Sous-Secrétaire des Travaux Publics.

(1) Art. 13 of the Rules and Regulations.

*Finland.* — H. Roos, Directeur Général des Chemins de fer de l'Etat de Finlande.

*France.* — M. DORGES, Secrétaire Général aux Travaux Publics, Directeur Général des Chemins de fer et des Transports au Ministère des Travaux Publics, membre de la Commission permanente de l'Association.

*United Kingdom and Northern Ireland and the territories for whose international relations the U. K. is responsible.* — Sir Gilmour JENKINS, Secretary to Minister of Transport of Great Britain, member of the Permanent Commission of the Association.

*Greece.* — S. GIALISTRAS, Directeur Général des Chemins de fer de l'Etat hellénique.

*India.* — K. C. BAKHLE, Chief Commissioner of Railways to the Railway Board of India.

*Ireland.* — D. MORRISSEY, Minister for Industry and Commerce.

*Luxemburg.* — A. CLEMANG, Commissaire du Gouvernement pour les Affaires de Chemins de fer.

*New Zealand.* — Ranald J. HARVEY, Consulting Engineer to the Government of New Zealand, member of the Permanent Commission of the Association.

*Pakistan.* — H. SPARROW, Chief Mechanical Engineer, North Western Railway.

*South Africa.* — G. LINDBERG, Advisory Engineer to the High Commissioner for the Union of South Africa, member of the Permanent Commission of the Association.

*Norway.* — O. HOLTMON, Directeur en Chef des Chemins de fer de l'Etat norvégien.

*Netherlands.* — H. VAN GALEN LAST, Directeur général des Transports, Ministère des Transports et du Waterstaat, membre de la Commission permanente de l'Association.

*Portugal.* — R. DA COSTA COUVREUR, Ancien Président du Conseil Supérieur des Travaux Publics au Ministère des Travaux Publics et des Communications, membre de la Commission permanente de l'Association.

*Sweden.* — A. WINBERG, Premier Secrétaire au Ministère des Communications.

*Switzerland.* — F. STEINER, Directeur de l'Office Fédéral des Transports, membre de la Commission permanente de l'Association.

*Thailand.* — L. Videt YONTRAKICH, Chief Civil Engineer, Royal State Railways.

*Turkey.* — Ing. K. OÇMAN, Directeur technique de la Section des Moteurs au Service de la Voie des Chemins de fer de l'Etat.

*Yugoslavia.* — Ing. V. DESIĆ, Professeur à la Faculté technique de Belgrade, Conseiller

permanent du Ministère des Chemins de fer, membre de la Commission permanente de l'Association.

*General Secretaries :*

P. GHILAIN, Directeur du Service du Matériel et des Achats de la Société Nationale des Chemins de fer belges, Vice-président et Secrétaire Général de la Commission permanente de l'Association;

Dr. Ing. Mario VALDIVIESO, Inspecteur en Chef au Service du Personnel et des Affaires générales des Chemins de fer de l'Etat italien, Secrétaire du Comité exécutif italien d'organisation.

*Assistant General Secretary :*

Ch. E. WHITWORTH, Assistant to Chief Officer (Administration), The Railway Executive, British Railways.

# BUREAU OF THE SECTIONS

## SECTION I. — Way and works.

- President :* R. CLAUDON, Inspecteur Général des Ponts et Chaussées, Vice-Président du Conseil d'Administration de la Société Nationale des Chemins de fer français, membre de la Commission permanente de l'Association.
- Assistant :* JULIEN, Ingénieur en Chef des Ponts et Chaussées, Ingénieur en Chef des Transports chargé du contrôle des Installations fixes au Ministère des Travaux publics et des Transports de France.
- Vice-presidents :* H. Roos, Directeur Général des Chemins de fer de l'Etat de Finlande.  
K. C. BAKHLE, Chief Commissioner of Railways to the Railway Board of India;  
T. C. COURTNEY, Chairman of the Coras Iompair Eireann, member of the Permanent Commission of the Association;  
C. LUCCHINI, Président de la Direction Générale des Chemins de fer fédéraux suisses, membre de la Commission permanente de l'Association.
- Principal Secretary :* J. DUBUS, Ingénieur en chef à la Société Nationale des Chemins de fer belges, Secrétaire technique à l'Association Internationale du Congrès des Chemins de fer.

### *Secretaries :*

- UNAL, Ingénieur, Chef de la Subdivision de l'Entretien de la Région Méditerranée de la Société Nationale des Chemins de fer français;  
J. H. GLENDINNING, District Engineer, The Rail-
- way Executive, Eastern Region, British Railways;  
Dr. Ing. L. FERRETI, Ingénieur de 2<sup>e</sup> classe au Service de la Voie des Chemins de fer de l'Etat italien.

## SECTION II. — Locomotives and rolling stock.

- President :* Lord HURCOMB, Chairman of the British Transport Commission, member of the Permanent Commission of the Association.
- Vice-presidents :* F. TURELL, Sous-Secrétaire des Travaux Publics (Espagne);  
S. GIALISTRAS, Directeur Général des Chemins de fer de l'Etat hellénique.

*Principal Secretary :* F. UYTBORCK, Ingénieur à la Société Nationale des Chemins de fer belges, Secrétaire technique à l'Association Internationale du Congrès des Chemins de fer.

*Secretaries :*

M. BONNEFON, Inspecteur divisionnaire au Service Technique du Matériel et de la Traction de la Société Nationale des Chemins de fer français;

A. E. BERESFORD, Engineer, British Railways; Dr. Ing. G. LEVI, Inspecteur au Service du Matériel et de la Traction des Chemins de fer de l'Etat italien.

### SECTION III. — Working.

*President :* Dr. Ing. G. C. PALMIERI, Chef de Service Principal, Conseiller d'Administration des Chemins de fer de l'Etat italien.

*Vice-présidents :* Dr. E. SEIDLER, Directeur Général des Chemins de fer Fédéraux autrichiens; H. VAN GALEN LAST, Directeur général des Transports, Ministère des Transports et du Waterstaat (Netherlands), membre de la Commission permanente de l'Association; R. DA COSTA COUVREUR, Ancien Président du Conseil Supérieur des Travaux publics au Ministère des Travaux publics et des Communications du Portugal, membre de la Commission permanente de l'Association; Ranald J. HARVEY, Consulting Engineer to the Government of New Zealand (Railways), member of the Permanent Commission of the Association.

*Principal Secretary :* E. VOORDECKER, Ingénieur en Chef à la Société Nationale des Chemins de fer belges.

*Secretaries :*

DELACOUR, Inspecteur divisionnaire au Service Central du Mouvement de la Société Nationale des Chemins de fer français;

P. E. PUNT, British Railways; Dr. F. TILLI, Inspecteur Principal au Service du Mouvement des Chemins de fer de l'Etat italien.

### SECTION IV. — General.

*President :* Dr. J. WANSINK, Directeur Général de la S. A. des Chemins de fer néerlandais.

*Vice-presidents :* Dr. Sayed Abdel WAHID BEY, Directeur Général des Chemins de fer de l'Etat égyptien, membre de la Commission permanente de l'Association; G. LINDBERG, Advisory Engineer to the High Commissioner for the Union of South Africa, member of the Permanent Commission of the Association.

*Principal Secretary :* H. LENFANT, Ingénieur Principal à la Société Nationale des Chemins de fer belges.

*Secretaries :*

BRECHOT, Ingénieur, Chef de la subdivision de la Documentation au Service technique de la Direction Générale de la Société Nationale des Chemins de fer français;

M. BOONEN, Assistant of the Representative of the British Railways, Brussels.  
Dr. A. FAVARA, Inspecteur en Chef au Service Commercial et du Trafic des Chemins de fer de l'Etat italien.

## SECTION V. — Light railways and colonial railways.

*President :* W. A. VRIELYNCK, Directeur du Service de la Traction et du Matériel de la Société Nationale des Chemins de fer Vicinaux (Belgique).

*Vice-presidents :* A. CLEMANG, Commissaire du Gouvernement pour les Affaires des Chemins de fer (Luxembourg);  
P. CHRISTENSEN, Secrétaire Général au Ministère des Travaux Publics du Danemark;  
Y. GIROUD, Chef du Service des Transports à la Direction des Travaux Publics (Tunisie);  
H. SPARROW, Chief Mechanical Engineer, North Western Railway (Pakistan).

*Principal Secretary :* F. VAN LIERDE, Ingénieur en Chef à la Société Nationale des Chemins de fer Vicinaux (Belgique).

*Secretaries :*

SURLEAU, Sous-Chef d'Etudes administratives au Service Commercial de la Société Nationale des Chemins de fer français;

E. CONSTANT, Engineer, personal assistant to

the Chief Civil Engineer, Southern Region, British Railways;

Dr. Ing. G. CONTALDI, Inspecteur Principal au Service de la Voie des Chemins de fer de l'Etat italien.

*General Interpreter :* Dr. A. VELLEMAN.

## **Programme of the sectional meetings.**

# Programme of the

DATE.	SECTION I. WAY AND WORKS.	SECTION II. LOCOMOTIVES AND ROLLING STOCK
Tuesday 26th September . . . . . { 9 a.m. 9.30 a.m.	<p>Installation of the Section and fixing the programme of procedure.</p> <p>I. Modern tendencies in the building of railway structures, especially bridges. — Results obtained in the construction of railway bridges in reinforced concrete. — Future prospects of the pre-stressed concrete.</p>	<p>Installation of the Section and fixing the programme of procedure.</p> <p>IV. The comfort of passengers in coaches, railcars and electric motor coaches : sound-proofing; lighting; heating, air condition; ventilation, thermic insulation; upholstery; running stability (type of bogie and suspension). (Continuation and end.)</p>
Wednesday 27th September . . . . . 9 a.m.	<p>I. — Modern tendencies in the building of railway structures, especially bridges. — Results obtained in the construction of railway bridges in reinforced concrete. — Future prospects of the pre-stressed concrete. (Continuation and end.)</p> <p>II. Rail-joints : improvements in fishplated joints. — Use of long welded rails : optimum length in relation to the safety and good condition of the permanent way. — Expansion gaps. — Determination of standard allowances.</p>	<p>IV. The comfort of passengers in coaches, railcars and electric motor coaches : sound-proofing; lighting; heating, air condition; ventilation, thermic insulation; upholstery; running stability (type of bogie and suspension). (Continuation and end.)</p> <p>V. Improvements in the construction of rolling stock (motor and trailer) in view of increasing the mileage between repa.</p>
Thursday 28th September . . . . . 9 a.m.	<p>II. Rail-joints : improvements in fishplated joints. — Use of long welded rails : optimum length in relation to the safety and good condition of the permanent way. — Expansion gaps. — Determination of standard allowances. (Continuation and end.)</p>	<p>V. - Improvements in the construction of rolling stock (motor and trailer) in view of increasing the mileage between repa. (Continuation and end.)</p>
Friday 29th September . . . . . 9.30 a.m.	←—————	Pl
Monday 2nd October. . . . . 9 a.m.	<p>III. New technical methods adopted for the design and construction of large marshalling yards. Lay-out and equipment.</p>	<p>VI. Comparative study of the different types of transmission between motors and axles of electric locomotives, electric motor coaches and Diesel electric railcars. Effect on the track of the types of bogies and systems of motor suspension.</p>
Tuesday 3rd October . . . . . 9 a.m.	<p>III. New technical methods adopted for the design and construction of large marshalling yards. Lay-out and equipment. (Continuation and end.)</p>	<p>VI. Comparative study of the different types of transmission between motors and axles of electric locomotives, electric motor coaches and Diesel electric railcars. Effect on the track of the types of bogies and systems of motor suspension. (Continuation and end.)</p>
Wednesday 4th October . . . . . { 9.30 a.m. 11.30 a.m.	←————— ←—————	P Closing cer.

## ectional meetings.

SECTION III. WORKING.	SECTION IV. GENERAL.	SECTION V. LIGHT RAILWAYS AND COLONIAL RAILWAYS.
I. Installation of the Section and fixing the programme of procedure.	II. Organizing methods to be used in large marshalling yards and terminals, to reduce to the minimum the cost per wagon shunted.	III. Installation of the Section and fixing the programme of procedure.
II. Organizing methods to be used in large marshalling yards and terminals, to reduce to the minimum the cost per wagon shunted. ( <i>Continuation and end.</i> )	X. Drawing up the financial balances regarding passenger and goods services taking into account the prime cost of trains : per category, per line and per type of motive power. Principles and methods of calculation.	XIII. Modernisation of the maintenance methods of the permanent way on the light railways.
X. Modern safety and signal installations (centralising apparatus for block system and signals). — Central electric apparatus with individual levers and « all relay » levers (all electric interlocking). — Automatic block-system with continuous current and coded current. — Light and speed signalling.	X. Drawing up the financial balances regarding passenger and goods services taking into account the prime cost of trains : per category, per line and per type of motive power. Principles and methods of calculation. ( <i>Continuation and end.</i> )	XIII. Modernisation of the maintenance methods of the permanent way on the light railways. ( <i>Continuation and end.</i> )
X. Modern safety and signal installations (centralising apparatus for block system and signals). — Central electric apparatus with individual levers and « all relay » levers (all electric interlocking). — Automatic block-system with continuous current and coded current. — Light and speed signalling. ( <i>Continuation and end.</i> )	XI. Organisation and development of medical and social services with partnership of the staff in their management.	XIV. Change over from steam-locomotive traction to Diesel traction.
III. In view of the ever increasing weight of road competition, what are the most appropriate measures, apart from reduced rates, for keeping traffic by full wagon loads in the hands of the railway?	XI. Organisation and development of medical and social services with partnership of the staff in their management. ( <i>Continuation and end.</i> )	XIV. Change over from steam-locomotive traction to Diesel traction. ( <i>Continuation and end.</i> )
III. In view of the ever increasing weight of road competition, what are the most appropriate measures, apart from reduced rates, for keeping traffic by full wagon loads in the hands of the railway? ( <i>Continuation and end.</i> )	XII. What must the importance and the prevailing conditions of traffic be, in order that from the economic point of view : a) the construction of a railway line; b) the keeping operating an existing railway line, should be useful?	XV. Signalling on single track lines.
the Session.	XII. What must the importance and the prevailing conditions of traffic be, in order that from the economic point of view : a) the construction of a railway line; b) the keeping operating an existing railway line, should be useful? ( <i>Continuation and end.</i> )	XV. Signalling on single track lines. ( <i>Continuation and end.</i> )

# **Summary report of the discussions in the sections.**

## **SECTION I. — Way and Works.**

*President : R. CLAUDON.*

*Assistant : M. JULIEN.*

*Vice-Presidents : H. Roos, K. C. BAKHLE, T. C. COURTNEY and C. LUCCHINI.*

*Principal Secretary : J. DUBUS.*

### **QUESTION I.**

**Modern tendencies in the building of railway structures, especially bridges. Results obtained in the construction of railway bridges in reinforced concrete. Future prospects of the pre-stressed concrete.**

#### **Preliminary documents.**

Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by A. DEAN. (See *Bulletin*, March 1950, p. 259 or separate issue No. 6.)

Report (Belgium and Colony, Denmark, France and Colonies, Luxemburg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by L. MARGUERAT. (See *Bulletin*, August 1950, p. 1657 or separate issue No. 35.)

Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by

G. POLSONI. (See *Bulletin*, September 1950, p. 1887 or separate issue No. 38.)

Special Reporter : G. POLSONI (See *Bulletin*, October 1950, p. 2007.)

#### **Report of Section I.**

(See *Daily Journal of the Session*, No. 1, pp. 11 and 13; No. 2, p. 2 to p. 7; No. 5, p. 2.)

#### **Meeting held on September 26th., 1950.**

The PRESIDENT asked M. DUBUS to read the summaries of the special report prepared by M. l'Ingénieur Professeur G. POLSONI <sup>(1)</sup>.

1. *General. Present design requirements. Live load. Dynamic load, provision for fatigue.*

Other than on American Railways, the live loadings now adopted are reasonably comparable and it is considered that a limit has now been reached.

<sup>(1)</sup> The English translation of the Summaries of Question I was amended as shown on pp. 13/14 of the *Daily Journal of the Session*, No. 1, dated 26th. September 1950.

Formulae laying down the dynamic loading, related solely to the span of a bridge do not adequately cover all dynamic components. The effect of irregularities in the track, including the effect of rail joints, should be provided for.

Tests are desirable.

Special provision for fatigue effect is made when actual reversal of stress will occur.

It would be advisable to determine the effect of the eventual recovery of the structure of the metal for slower frequencies than those which have been considered up to the present in laboratory experiments.

— Summary 1 was adopted without modification.

## 2. Metal Bridges.

Decks entirely of metal construction are generally adopted when construction depth is limited. In such cases the track is generally carried on sleepers or cross ties, rail-bearers are usually fitted into the cross girders to give a shallow construction depth, bridging pieces being provided for continuity.

The use of welding is still infrequent, but is being developed.

The use of reinforced concrete decks on metal bridges has been adopted widely in recent years, in conjunction with ballasted tracks, with the accompanying advantages.

Metal bridges are used for the bigger spans, for cases of limited construction depth and where provision must be made for settlement of foundations.

Plate girder construction is simpler and economical up to spans of 100-125 ft. For longer spans lattice girders of the simplest type are used.

Mild steel of about 28-32 tons/sq. inch ultimate is used widely. The use of special steel is only recommended in special cases. The use of light weight alloys has hitherto been limited to less important members.

Welding has been adopted for the construction of medium span plate girder bridges, with success up to the present. Only one case has been reported of the construction of a completely welded lattice girder bridge.

Combined steel and concrete construction, designed deliberately for composite action is a useful form which can be adopted with advantage for simple spans up to about 100-125 ft. Application to continuous girder construction involves prestressing the concrete deck at the intermediate piers.

The effect of shrinkage and the permanence of the bond between the two materials is not yet fully understood.

M. R. LEVI (*Société Nationale des Chemins de fer français*), stated that, referring to the first paragraph, the use of sleepers is of particular interest on curves but that it is better to use longitudinal rail bearers on the straight.

M. MARGUERAT (*Reporter*) replied that mention had been made of this question in his report. The points raised were noted but no alteration was proposed in this respect.

An exchange of views took place on the subject of fixing the rail bearers between the flanges of the cross girders and M. R. LEVI proposed that the first paragraph should be completed by indicating that the fixing of the rail bearers between the flanges of the cross girders was not only to reduce the construction depth but also to facilitate the satisfactory fixing of the rail bearers to the cross girder. After a discussion it was decided to review the first paragraph which was finally re-drafted as follows :

« Decking entirely of metal is indicated when there is only restricted construction depth available. In such a case the track is usually carried on sleepers or cross-ties, the stringers or railbearers are usually fixed between the flanges of the cross girders, continuity being assured by bridging pieces; the fixing can then be

made in a way, at least as satisfactory as when the rail bearers are placed on top of the cross girders. Welding of site connections is still rare, but tends to be developed. »

In the second paragraph M. RENDA (*Chemins de fer de l'Etat italien*) stated that the word « widely » is too strong. This word was deleted.

After a discussion between MM. RENDA, BOUCIQUÉ (*Société Nationale des Chemins de fer belges*) and MARGUERAT, the third paragraph was retained without amendment.

With regard to the penultimate paragraph, M. R. LEVI mentioned that the solution of the composite beam, iron and concrete, had so far only been used in the case of two bridges on the S. N. C. F. and that further experiments were necessary. It was decided to modify in the following way the first two lines of this paragraph :

« Combined steel and concrete construction designed deliberately for composite action is a solution which might be interesting and advantageous..., etc. »

A discussion took place on the last paragraph. It was decided to re-draft it finally as follows :

« The first bridges of this type should be kept under observation to find out how the bond between the two materials was affected in the course of time. »

— *Summary 2*, amended as indicated, was adopted.

### 3. Arch bridges, built of concrete or stone.

Such bridges are generally economical, particularly in maintenance, and are pre-

fferred whenever local conditions are suitable. Concrete is widely used and is the cheaper; construction in natural stone gives improved appearance, but is generally more costly; stone faced concrete is a suitable compromise provided steps are taken to obtain a reliable bond.

Weak concrete is generally used for the backing between spandril walls.

Pin type joints are not necessary unless the bearing of the foundations is in doubt.

There exists inadequate reliable information on the precise dynamic loading of masonry arches carrying rail traffic, but it is likely to be less than for metal bridges.

— *Summary 3* was adopted without alteration.

### 4. Underbridges comprising girders encased in concrete.

This is a useful form of construction when construction depth is shallow and when line occupation facilities are limited.

It involves a somewhat extravagant use of steel.

M. MARGUERAT suggested the addition to the 2nd paragraph of the following phrase :

« And it is necessary to provide adequate transverse reinforcement. »

— *Summary 4* was adopted with this modification.

### 5. Road bridges or over-bridges.

It appears that the most usual type at the present time is the three span reinforced concrete bridge.

Some countries make use of pre-stressed concrete.

It is general practice to provide as few piers as is reasonably possible in the construction of over-bridges spanning station and yard layouts.

— This *Summary 5* was adopted without discussion.

### *6. Piers and abutments.*

Mass concrete is most widely adopted for piers and abutments. Hollow construction is only considered for special cases and where the intensity of foundation loading must be kept unusually low. Reinforced concrete, or steel framed piers are adopted to reduce obstruction to visibility and where loading gauge clearance requirements restrict the possible thickness.

— *Summary 6* was adopted without modification.

### *7. Platform roofs.*

Both steel and reinforced concrete are used, the umbrella type roof being the most usual form of construction.

Glazing is provided in most countries to meet particular local natural lighting requirements.

Other than where extreme climatic conditions prevail, it is usual for design purposes to provide for either snow load, or wind load, whichever is the greater, but not for both to be active simultaneously.

M. R. LEVI stated that the end of the final phrase did not apply to France, a country with a moderate climate, but where the regulations laid down that both snow and wind load should be taken into account.

M. MARGUERAT replied that in France, he believed, the regulations took into account a reduced depth of snow.

M. R. LEVI mentioned the difficulties in applying the formula for loading so that the permissible stresses were not exceeded.

The PRESIDENT stated that new regulations were being drafted in France as those in force at present were too rigid.

At the request of M. R. LEVI it was

decided to modify the last paragraph of Summary No. 7 as follows :

“ Except in the case of very severe climates, the determination of the sections required is made, as a rule, by taking into account either the snow or wind load, but not by adding them together. ”

— *Summary 7*, amended accordingly was adopted.

### *8. Testing of structures.*

Testing of structures covers the following fields :

1° to confirm the behaviour and capacity of a new structure before it is brought into use;

2° to determine the safe load capacity of old bridges;

3° to investigate special general problems such as shrinkage, creep, dynamic effects of live loads.

Agreed without discussion.

### *9. Reinforced concrete underbridges.*

Reports indicate that simple reinforced concrete slabs are used up to spans ranging from 18 to 48 ft.

Lighter forms of construction, using T. beams or hollow beams, have enabled longer reinforced concrete spans to be built; particularly in continuous construction and with variable moments of inertia.

For long span bridges, arch construction lends itself more effectively to the rational use of reinforced concrete.

Not only should high strength be aimed at, but the concrete should be as nearly waterproof as possible and there should be a minimum of shrinkage.

Care should be taken to provide reinforcement in all parts of the structure where tension stresses occur, even if these stresses have not been taken into account in the design.

M. ORLANDINI (*Chemins de fer de l'Etat, Italie*) considered that the span of 48 ft. referred to in the first paragraph is too great and that it should be reduced to 26 feet.

M. MARGUERAT replied that the maximum span is a function of economic factors and that he had cited the spans given by the various railways which go up to 45 ft. in Switzerland and 48 ft. in Belgium.

M. BOUCIQUÉ agreed that the figure of 48 ft. is exceptional and that, in general, the S. N. C. B. did not go beyond 26-30 ft.

M. ALFANO (*Chemins de fer de Madagascar*), proposed that the first paragraph should be amended as follows :

« Slab construction is used up to maximum spans of 20-33 ft. and in certain cases for spans up to 48 ft. »

Agreement was reached on this amendment, and *Summary 9* amended as indicated was adopted.

#### 10. Pre-stressed concrete.

Pre-stressed concrete construction has already been used on several railway systems, but as yet in only a few cases for underbridges of spans not greater than about 36 ft. carrying usual main line loading, and 60 ft. carrying meter gauge loading.

At present, pre-stressed concrete lends itself to mass production of similar units; it also enables shallower construction to be adopted than when using ordinary reinforced concrete. It is hoped that its use will also be accompanied by reduced maintenance.

Its field of application will be extended when higher working stresses in the steel and concrete can be adopted with confidence.

There is need for more information on

certain technical details relating to the practice and application of pre-stressing of concrete.

— *Summary 10* was agreed without discussion.

The PRESIDENT thanked the Special Reporter and the Reporters for the remarkable reports they had furnished and he declared as adopted by the Section the Summaries reproduced below :

#### SUMMARIES.

##### 1. General. Present design requirements. Live load. Dynamic load, provision for fatigue.

« Other than on American Railways, the live loadings now adopted are reasonably comparable and it is considered that a limit has now been reached.

« Formulae laying down the dynamic loading, related solely to the span of a bridge do not adequately cover all dynamic components. The effect of irregularities in the track, including the effect of rail joints, should be provided for.

« Tests are desirable.

« Special provision for fatigue effect is made when actual reversal of stress will occur.

« It would be advisable to determine the effect of the eventual recovery of the structure of the metal for slower frequencies than those which have been considered up to the present in laboratory experiments.

##### 2. Metal bridges.

« Decking entirely of metal is indi-

« cated when there is only restricted  
« construction depth available. In such  
« a case the track is usually carried on  
« sleepers or cross ties, the stringers or  
« rail bearers are usually fixed between  
« the flanges of the cross girders, con-  
« tinuity being assured by bridging  
« pieces; the fixing can then be made  
« in a way, at least as satisfactory as  
« when the rail bearers are placed on  
« top of the cross girders.

« Welding of site connections is still  
« rare, but tends to be developed.

« The use of reinforced concrete  
« decks on metal bridges has been  
« adopted in recent years, in conjunc-  
« tion with ballasted tracks, with the  
« accompanying advantages.

« Metal bridges are used for the  
« bigger spans, for cases of limited con-  
« struction depth, and where provision  
« must be made for settlement of foun-  
« dations.

« Plate girder construction is simpler  
« and economical up to spans of 100-  
« 125 ft. For longer spans lattice  
« girders of the simplest type are used.

« Mild steel of about 28-32 tons per  
« sq. inch ultimate is used widely. The  
« use of special steel is only recom-  
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« light weight alloys has hitherto been  
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« 125 ft. Application to continuous  
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« stressing the concrete deck at the inter-  
« mediate piers.

« The first bridges of this type should  
« be kept under observation to find out  
« how the bond between the two  
« materials was affected in the course  
« of the time.

### 3. *Arch bridges, built of concrete or stone.*

« Such bridges are generally eco-  
« nomical, particularly in maintenance  
« and are preferred whenever local con-  
« ditions are suitable. Concrete is  
« widely used and is the cheaper; con-  
« struction in natural stone gives im-  
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« more costly; stone faced concrete is  
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« are taken to obtain a reliable bond.

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« the backing between spandril walls.

« Pin type joints are not necessary  
« unless the bearing of the foundations  
« is in doubt.

« There exists inadequate reliable  
« information on the precise dynamic  
« loading of masonry arches carrying  
« rail traffic, but it is likely to be less  
« than for metal bridges.

### 4. *Underbridges comprising girders encased in concrete.*

« This is a useful form of construc-  
« tion when construction depth is  
« shallow and when line occupation

« facilities are limited. It involves a « somewhat extravagant use of steel, « and it is necessary to provide ade- « quate transverse reinforcement.

#### *5. Road bridges or over-bridges.*

« It appears that the most usual type « at the present time is the three span « reinforced concrete bridge.

« Some countries make use of pre- « stressed concrete.

« It is general practice to provide as « few piers as is reasonably possible in « the construction of overbridges span- « ning station and yard layouts.

#### *6. Piers and abutments.*

« Mass concrete is most widely adopt- « ed for piers and abutments. Hollow « construction is only considered for « special cases and where the intensity « of foundation loading must be kept « unusually low. Reinforced concrete, « or steel framed piers are adopted to « reduce obstruction to visibility and « where loading gauge clearance require- « ments restrict the possible thickness.

#### *7. Platform roofs.*

« Both steel and reinforced concrete « are used, the umbrella type roof being « the most usual form of construction.

« Glazing is provided in most coun- « tries to meet particular local natural « lighting requirements.

« Except in the case of very severe « climates, the determination of the « sections required is made, as a rule, « by taking into account either the snow « or wind load, but not by adding them « together.

#### *8. Testing of structures.*

« Testing of structures covers the « following fields :

« 1° to confirm the behaviour and « capacity of a new structure before it « is brought into use;

« 2° to determine the safe load « capacity of old bridges;

« 3° to investigate special general « problems such as shrinkage, creep, « dynamic effects of live loads, etc.

#### *9. Reinforced concrete underbridges.*

« Slab construction is used up to « maximum spans of 20-33 ft. and in « certain cases for spans up to 48 ft.

« Lighter forms of construction, using « T. beams or hollow beams, have « enabled longer reinforced concrete « spans to be built, particularly in con- « tinuous construction and with variable « moments of inertia.

« For long span bridges, arch con- « struction lends itself more effectively « to the rational use of reinforced con- « crete.

« Not only should high strength be « aimed at, but the concrete should be « as nearly waterproof as possible and « there should be a minimum of shrink- « age.

« Care should be taken to provide « reinforcement in all parts of the struc- « ture where tension stresses occur, even « if these stresses have not been taken « into account in the design.

#### *10. Pre-stressed concrete.*

« Pre-stressed concrete construction « has already been used on several rail- « way systems, but as yet, in only a few

“ cases for underbridges of spans not greater than about 36 ft. carrying usual main line loading, and 60 ft. carrying meter gauge loading.

“ At present, pre-stressed concrete lends itself to mass production of similar units, it also enables shallower construction to be adopted than when using ordinary reinforced concrete. It is hoped that its use will also be accompanied by reduced maintenance.

“ Its field of application will be extended when higher working stresses in the steel and concrete can be adopted with confidence.

“ There is need for more information on certain technical details relating to the practice and application of pre-stressing of concrete. ”

— The Plenary Meeting held on September 29th approved the above summaries.

## QUESTION II.

**Rail-joints:** improvements in fishplated joints. Use of long welded rails: optimum length in relation to the safety and good condition of the permanent way. Expansion gaps. Determination of standard allowances.

### Preliminary documents.

Report (Belgium and Colony, Denmark, France and Colonies, Luxemburg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by O. LEDUC. (See *Bulletin*, February 1950, p. 127 or separate issue No. 2.)

*Supplement to Report* by O. LEDUC. (See *Bulletin*, September 1950, p. 2001.)

Report (Australia, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by B. RENDA. (See *Bulletin*, March 1950, p. 167 or separate issue No. 3.)

Report (America (Nord and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by P. CROOM-JOHNSON. (See *Bulletin*, March 1950, p. 207 or separate issue.)

*Special Reporter* : O. LEDUC. (See *Bulletin*, October 1950, p. 2017.)

## Report of Section I.

(See *Daily Journal of the Session* No. 1, p. 11; No. 3, p. 2 to 5; No. 4, p. 2; No. 5, p. 2.)

### Meeting held on September 27th., 1950.

The PRÉSIDENT called upon M. DUBUS (*Principal Secretary*) to read the summaries of the special report drafted by M. l'Ingénieur en chef LEDUC.

### FIRST PART.

#### Fishplated rail joints.

##### *Summary No. 1 :*

1. It is apparent from a study of the reports received that there has been no considerable modification to the traditional fishplated joint, which consists of two fishplates, short or long, strengthened to varying degrees by lower or upper ribs, and held in place by bolts through the web of the rail. Complicated arrangements to provide a continuous running surface to the rail at the joint are not found in use to give the advantages hoped for by their inventors.

Slant cutting of the rail ends is not favoured in current practice.

— Agreed without discussion.

#### *Summary No. 2 :*

2. To avoid excessive fatigue in the constituent parts of the joint, it is usual to reduce the sleeper spacing adjacent to rail ends. The most general practice is to support the rail on two independent sleepers closely spaced, in preference to a double sleeper. As to the joint supported on a single sleeper, this now seems to be falling into disuse except in the United States where, from information received, it is still widely practised.

Mr. BAKHLE, *Vice-President*, stated that in India the use of a single cast iron sleeper supporting the joint was satisfactory, and he asked that this should be referred to in the text.

Mr. CAMPBELL (*British Railways*) remarked that joint sleepers should always be firmly packed.

— The text adopted for *Summary No. 2* was amended accordingly.

#### *Summary No. 3 :*

3. The most general arrangement is for joints to be opposite each other. Whilst the use of joints out of square or staggered by half a rail length continues to be employed in some instances on sharp curves to assist in the maintenance of alignment, the use of staggered joints elsewhere which was once fairly frequent practice has gradually fallen into disfavour, probably because of the swing which they induce in rolling stock on tracks where the rail length is comparatively short. On modern track, however, with longer rails it would seem that better results can be obtained from the use of staggered joints, and it would be of interest, therefore, to renew experiments in this direction.

Mr. CAMPBELL did not think that the quality of the joint was better in the case of long rails. It is essentially the adequacy of the packing which is of importance. He insisted that there was a rolling in the case of staggered joints, and he further stated that this rolling would be accentuated when the rail length gave rise to a resonance with regard to the frequency of the vibrations of the springs. Mr. BAKHLE stated that in India good results had been obtained by the short stagger of joints to the extent of half the distance between bogie wheels.

M. RENDA (*Reporter*) stated that he had recently laid several hundred kilometres of track in Italy with joints laid out of square, or staggered, with rail lengths of from 118-155 ft. Where the track is laid with staggered joints the amount of staggering is 59 ft. Where the joints are laid out of square it is 39 ft. for rail lengths of 118 ft.

Lt. Col. WILSON (*Ministry of Transport, Great Britain*) and Mr. CAMPBELL, insisted that everything reverts to a question of maintenance, and that very good results are obtained with ordinary joints.

MM. LUCCHINI, *Vice-President*, RENDA and LEDUC consider that the use of long rails facilitates and simplifies maintenance and decreases the cost.

— The original text of *Summary No. 3* was finally adopted.

#### *Summary No. 4 :*

4. From the reports received, there does not seem to be any advantage in equating

the section modulus of the fishplates with that of the rail.

— Agreed without discussion.

#### *Summary No. 5 :*

5. To allow expansion at the rail ends, the holes in the fishplates and the rail must be larger than the diameter of the fishbolts.

Up to the present the general practice has been to make larger holes in the rail than in the fishplate, to minimise the weakening of the latter. On the other hand, it would seem that the adoption of smaller holes in the rail would reduce the risk of cracks which often commence at fishbolt holes; the use of oval holes in the fishplate would then allow the vertical dimension of the holes to be kept to a minimum.

— Agreed without discussion.

#### *Summary No. 6 :*

6. The use of fishbolts of a relatively small diameter not only avoids having large holes in the rail and fishplate, but also makes the maximum possible use of the elasticity of the metal of the bolt.

Mr. CAMPBELL asked for some information as to the meaning of the words « but also makes the maximum possible use of the elasticity of the metal of the bolt ».

M. R. LEVI (*Société Nationale des Chemins de fer français*) replied that by « elasticity » he aimed at getting the greatest possible elastic strain.

— The *Summary No. 6* was adopted in its original text.

#### *Summary No. 7 :*

7. It does not seem advisable to support the joint by means of a fishplate formed to act as a bridge.

— Agreed without discussion.

#### *Summary No. 8 :*

8. The surfaces by which the fishplate makes contact with the head and the foot of the rail must be inclined to give a wedge effect and to allow for the taking up of wear. The most common practice is for the fishing angles to have an inclination of one in three at both the head and the foot of the rail.

Some systems have adopted an inclination of one in four, others a steeper inclination up to one in two, and sometimes the inclination differs at the head from that of the foot. There do not seem to be any particular advantages, however, in these variations.

— Agreed without discussion.

#### *Summary No. 9 :*

9. Fishplates are generally made of ordinary rolled steel, having an ultimate tensile strength slightly less than that of the rail. Some systems employ heat treatment but this practice does not seem to be increasing. The tests specified vary somewhat but offer no points of special interest and it is assumed that existing specifications give satisfaction.

— Agreed without modification.

#### *Summary No. 10 :*

10. Perfect alignment of running surfaces of the two rails meeting at the joint is of great importance. Rails should therefore be correctly matched when they are laid, and if possible rails from the same ingot should be placed together. The so-called « perfect » joint of the Belgian Railways is of great interest, but this is rather costly on account of the subsidiary welding which is involved.

Mr. CAMPBELL considered that the matching of rails during relaying operations was in practice impossible. He would like the tolerances allowed to the rolling mills to be reduced.

M. RENDA would also like a reduction in the tolerances.

Mr. CROOM-JOHNSON (*Reporter*) and M. LEDUC thought that too much could not be asked of the rolling mills and that the question of revision of tolerances was beyond the scope of this investigation.

M. MASSERON (*Chemins de fer tunisiens*) stated that in Tunis serviceable relaying was carried out with matched joints.

M. BOUCIQUÉ (*Société Nationale des Chemins de fer belges*) stated that in Belgium this practice was only used in the case of serviceable rails.

The text of *Summary No. 10* was altered accordingly and adopted.

#### *Summary No. 11:*

11. Correct alignment of running surfaces of the rails in service can be obtained by shims of appropriate thickness, inserted between the fishplates and the head of the rail at the fishing angles. Specially forged fishplates are also useful for this purpose but are less exact.

After an exchange of views between MM. RENDA, R. LEVI, and LEDUC, on the use of specially forged fishplates, *Summary No. 11* was amended.

#### *Summary No. 12:*

12. The more rapid wear at rail ends, resulting from wheel impact, produces battering and burring over of the top surface.

Some systems chamfer the rail ends so that burrs do not form too quickly.

Ends can be built up by welding to restore a smooth running surface and to allow rails to remain longer in the track.

Hardening of the metal by a suitable heat treatment can be expected to reduce these troubles at rail ends provided no appreciable brittleness results.

— Agreed without discussion.

#### *Summary No. 13:*

13. The use of spring washers to prevent slackening of fishbolt nuts is likely to have appreciable effect in reducing the labour of maintenance.

There does not yet seem to have been close investigation of the possibilities of the elastic fishplate. Where, however, fishplates with spring extensions at the ends have been used, useful results seem to have been obtained.

— Agreed without modification.

#### *Summary No. 14:*

14. Careful attention to the level of joints increases their life. It is generally recognised that joints should be attended to more frequently than the rest of the track and at least once a year; systematic packing of joints with small size stone ballast appears particularly satisfactory.

Following a proposal by Mr. CAMPBELL, the text of *Summary No. 14* finally adopted is as follows :

“ Careful attention to the level of joints increases their life. It is generally recognised that joints should be attended to more frequently, than the rest of the track, the frequency of such attention being a function of :

- “ the nature of the formation;
- “ the density of the traffic;
- “ the speed of the trains.

#### *Summary No. 15:*

15. Insulated block joints present difficulties which can be reduced by the use of fishplates made entirely of insulating material with sufficient mechanical strength; up to the present bakelised wood seems the only material to give reasonable satisfaction.

— Agreed without discussion.

## SECOND PART.

**Long welded rails.***Summary No. 16 :*

16. It has been learned from experience that rails of a length up to 300 ft. can be laid in the open in main lines without special provisions for expansion.

— Agreed without discussion.

*Summary No. 17 :*

17. Opinion is divided on the necessity to provide special devices for fixing rails to sleepers. It is quite evident that the rails must either be permanently held down tightly or must be fixed by a spring device which creates a permanent pressure between the rail and the sleeper.

After exchange of views between MM. BAKHLE and RENDA, the latter revealed that experiments carried out by the F. S. with indirect fastenings have given better results than where direct fastenings were used.

*Summary No. 17* was adopted in its original text.

*Summary No. 18 :*

18. The number of sleepers per mile, on tracks with long rail lengths, varies considerably on different systems. Some consider that it is advisable to adopt a rather close sleeper spacing.

— Agreed without discussion.

*Summary No. 19 :*

19. Neither anti-creep devices nor rail anchorages to the formation appear to be necessary to avoid creep of long rails.

— Agreed without discussion.

*Summary No. 20 :*

20. The sleeper spacing at welded joints can be the same as in the centre of the rails.

— Agreed without discussion.

*Summary No. 21 :*

21. In station sidings rails up to 330 ft. long can be laid in the ordinary way and no special precautions are necessary in regard to the attachment to sleepers or the fishing at joints.

— Agreed without discussion.

*Summary No. 22 :*

22. In tunnels, where temperature variations are small, the rails can be welded from one end to the other. There does not seem to be any need to employ gradually reducing lengths of rail between the long welded lengths and the normal track in the open.

— Agreed without discussion.

*Summary No. 23 :*

23. The material and the cross section of the ballasting of tracks with long welded rails is of great importance; to preserve alignment, particularly on curves, a good shoulder of ballast at the ends of the sleepers is essential.

— Agreed without discussion.

*Summary No. 24 :*

24. Some systems have already carried out tests in the open with rail lengths of several hundred yards and obtained encouraging results; it is very desirable that such tests should be continued on a wide scale.

The elimination of impact at rail joints is certainly a source of considerable economy both in maintenance of track and of rolling stock, it also adds considerably to comfort.

M. R. LEVI remarked that the use of very long rails permits of the joints being

laid out of square and thus reducing impact.

*Summary No. 24* was finally agreed after modification taking into account the various remarks.

*Summary No. 25 :*

25. It should be possible in the near future to determine from experience the type of joint (ordinary or special) to be employed for joining long rail lengths together, or connecting these to junction work and insulated block joints, etc.

M. R. LEVI pointed out that for experiments in long welded rails to be conclusive they should be carried out under ideal conditions, and should incorporate special joints. The switch type joint used in France involves an increase of expenditure corresponding to about 20 ft. in the length of the track, which gives a very small percentage when rail lengths of the order of 2 000 ft. are built up.

The text finally agreed had been amended accordingly.

*Summary No. 26.*

26. Theoretical studies and the tests which have been made give varying results for the stresses in the rail and the resistance of the track as a whole to these forces. It would be advantageous if these studies and experiments were continued on a uniform basis with common and well defined terms, so that the results could be easily compared. These should be concentrated on the actual stresses in the rails at different temperatures with different types of track. It would also be useful to find out by experiment the maximum resistance which different types of permanent way and ballast can develop against movement as a result of the stresses in the rail. Such studies and tests should enable a decision to be made as to the best temperature at which long rails should be laid.

— Agreed without discussion.

### THIRD PART.

#### Rail gaps in relation to temperature.

*Summary No. 27 :*

27. The general experience acquired is that the gaps between rails can be less than those theoretically calculated on a free expansion basis — in fact they can be reduced to a half or even less. The more the type of track resists creep, the smaller the gap can be.

— Agreed without discussion.

*Summary No. 28.*

28. Unless special arrangements are made for the joint, this is a weak point in the track which may be the origin of a buckle. It is therefore important that the play allowed for expansion, having regard to the type of track concerned, is not all taken up at too low a temperature, otherwise there is risk that excessive forces will arise in the rail. In the course of maintenance work, and particularly before the first warm weather of the year, the rail gaps should be restored to normal. It is, however, permissible to allow some tolerance in the gaps compared to that provided at the time of laying.

Mr. CAMPBELL started a discussion in which the following took part, the PRESIDENT, M. LEDUC, Lt. Col. WILSON, MM. BOUCIQUÉ, RENDA and R. LEVI and the following text was adopted :

“ 28. Unless special arrangements are made for the joint, this is a weak point in the track which may be the focal point of a buckle. It is therefore important that the space allowed for expansion, having regard to the type of track concerned, is not all taken up at too low a temperature, otherwise there is risk that excessive forces will arise in the rail. In the course of maintenance work, and particularly before the first hot weather of the year, the rail gaps

could be restored to normal. Examination should be made to ensure the fishplates will allow the rail ends to move freely. This might involve for example the unscrewing or the screwing up of the fishbolts.

It is, however, permissible to allow some tolerance in the gaps compared to that provided at the time of laying. »

#### *Summary No. 29 :*

29. Checking of joint gaps should be done at times of day when the temperature is not particularly high.

— Agreed without discussion.

#### **Meeting held on the 28th September 1950.**

The PRESIDENT informed the members of the Section that at the end of the meeting held on 27th September Mr. BAKHLE (*Vice-President*) had proposed the following text be substituted for the agreed *Summary No. 3* :

“ The most general arrangement is for joints to be opposite each other. Whilst the use of joints out of square, viz. with short stagger, or by half rail length, continues to be employed in some instances on curves to assist in better maintenance of alignment, the use of mid-staggered joints has gradually fallen into disfavour on many systems, probably because of the lurching which they tend to induce in rolling stock. As, however, there may be considerable advantages to be obtained from the use of joints out of square, it would be of interest to try out short staggering, say, equal to half the wheel base of a bogie truck, an arrangement which would tend to avoid lurching in rolling stock. »

MM. CAMPBELL and CROOM-JOHNSON supported the text proposed by Mr. BAKHLE with the reservation that certain terms should be corrected.

M. RENDA intervened to ask that the original text should be retained without amendment. He was supported in this argument by the PRESIDENT, M. JULIEN, and by the *Vice-President*, M. LUCCHINI. This was put to the vote and the retention of the text of *Summary No. 3* appearing in the record of the meeting of 27th September was confirmed by the majority.

— The text of the Summaries adopted is given hereafter :

#### **SUMMARIES.**

##### **FIRST PART.**

###### **Fishplated rail joints.**

“ 1. It is apparent from a study of the reports received that there has been no considerable modification to the traditional fishplated joint, which consists of two fishplates, short or long, strengthened to varying degrees by lower or upper ribs, and held in place by bolts through the web of the rail. Complicated arrangements to provide a continuous running surface to the rail at the joint are not found in use to give the advantages hoped for by their inventors. Slant cutting of the rail ends is not favoured in current practice.

“ 2. To avoid excessive fatigue in the constituent parts of the joint it is usual to reduce the sleeper spacing adjacent to rail ends. The most general prac-

“ tice is to support the rail on two  
“ independent sleepers, closely spaced,  
“ to allow of adequate packing in pre-  
“ ference to a double sleeper. As to the  
“ joint supported on a single sleeper,  
“ this now seems to be falling into  
“ disuse, except in the U. S. A. and in  
“ India, where from information receiv-  
“ ed it is still widely practised.

“ 3. The most general arrangement is  
“ for joints to be opposite each other.  
“ Whilst the use of joints out of square  
“ or staggered by half a rail length con-  
“ tinues to be employed in some in-  
“ stances on sharp curves to assist in  
“ the maintenance of alignment, the use  
“ of staggered joints elsewhere which  
“ was once fairly frequent practice has  
“ gradually fallen into disfavour, proba-  
“ bly because of the rolling which they  
“ induce in rolling stock on tracks  
“ where the rail length is comparatively  
“ short. On modern track, however,  
“ with longer rails it would seem that  
“ better results can be obtained from the  
“ use of staggered joints, and it would  
“ be of interest, therefore, to renew  
“ experiments in this direction.

“ 4. From the reports received, there  
“ does not seem to be any advantage in  
“ equating the section modulus of the  
“ fishplates with that of the rail.

“ 5. To allow expansion at the rail  
“ ends, the holes in the fishplates and  
“ the rail must be larger than the dia-  
“ meter of the fishbolts.

“ Up to the present the general prac-  
“ tice has been to make larger holes in  
“ the rail than in the fishplate, to mini-  
“ mise the weakening of the latter. On

“ the other hand, it would seem that the  
“ adoption of smaller holes in the rail  
“ would reduce the risk of cracks which  
“ often commence at fishbolt holes; the  
“ use of oval holes in the fishplate would  
“ then allow the vertical dimension of  
“ the holes to be kept to a minimum.

“ 6. The use of fishbolts of a rela-  
“ tively small diameter not only avoids  
“ having large holes in the rail and  
“ fishplate, but also makes the maximum  
“ possible use of the elasticity of the  
“ metal of the bolt.

“ 7. It does not seem advisable to  
“ support the joint by means of a fish-  
“ plate formed to act as a bridge.

“ 8. The surfaces by which the fish-  
“ plate makes contact with the head and  
“ the foot of the rail must be inclined  
“ to give a wedge effect and to allow  
“ for the taking up of wear. The most  
“ common practice is for the fishing  
“ angles to have an inclination of one  
“ in three at both the head and the  
“ foot of the rail.

“ Some systems have adopted an  
“ inclination of one in four, others a  
“ steeper inclination up to one in two,  
“ and sometimes the inclination differs  
“ at the head from that of the foot.  
“ There do not seem to be any parti-  
“ cular advantages, however, in these  
“ variations.

“ 9. Fishplates are generally made of  
“ ordinary rolled steel, having an ulti-  
“ mate tensile strength slightly less than  
“ that of the rail. Some systems employ  
“ heat treatment but this practice does  
“ not seem to be increasing. The tests  
“ specified vary somewhat but offer no

« points of special interest and it is  
« assumed that existing specifications  
« give satisfaction.

« 10. Perfect alignment of running  
« surfaces of the two rails meeting at  
« the joint is of great importance. It  
« is desirable therefore that rails should  
« be correctly matched when they are  
« laid, and if possible rails from the  
« same ingot should be placed together.  
« The so-called « perfect » joint of the  
« Belgian Railways is of great interest,  
« but on account of the subsidiary weld-  
« ing which is involved it is fairly costly,  
« except where serviceable rails are  
« used.

« 11. Correct alignment of running  
« surfaces of the rails in service can be  
« obtained by shims of appropriate  
« thickness inserted between the fish-  
« plates and the head of the rail at the  
« fishing angles. Specially forged and  
« cambered fishplates (hog-backed) are  
« useful for this purpose, but are less  
« exact.

« 12. The more rapid wear at rail  
« ends, resulting from wheel impact,  
« produces battering and burring over  
« of the top surface. Some systems  
« chamfer the rail ends so that burrs  
« do not form too quickly. Ends can  
« be built up by welding to restore a  
« smooth running surface and to allow  
« rails to remain longer in the track.  
« Hardening of the metal by a suitable  
« heat treatment can be expected to  
« reduce these troubles at rail ends  
« provided no appreciable brittleness  
« results.

« 13. The use of spring washers to

« prevent slackening of fishbolt nuts is  
« likely to have appreciable effect in  
« reducing the labour of maintenance.

« There does not yet seem to have  
« been close investigation of the possi-  
« bilities of the elastic fishplate. Where,  
« however, fishplates with spring exten-  
« sions at the ends have been used,  
« useful results seem to have been  
« obtained.

« 14. Careful attention to the level of  
« joints increases their life. It is gener-  
« ally recognised that joints should be  
« attended to more frequently, than the  
« rest of the track, the frequency of  
« such attention being a function of :

« the nature of the formation;  
« the density of the traffic;  
« the speed of the trains.

« Systematic packing of joints with  
« small size stone ballast appears parti-  
« cularly satisfactory.

« 15. Insulated block joints present  
« difficulties which can be reduced by  
« the use of fishplates made entirely of  
« insulating material with sufficient  
« mechanical strength; up to the present  
« bakelised wood seems the only mater-  
« ial to give reasonable satisfaction.

## SECOND PART.

### Long welded rails.

« 16. It has been learned from  
« experience that rails of a length up  
« to 300 ft. can be laid in the open in  
« main lines without special provisions  
« for expansion.

« 17. Opinion is divided on the  
« necessity to provide special devices

“ for fixing rails to sleepers. It is quite evident that the rails must either be permanently held down tightly or must be fixed by a spring device which creates a permanent pressure between the rail and the sleeper.

“ 18. The number of sleepers per mile, on tracks with long rail lengths, varies considerably on different systems. Some consider that it is advisable to adopt a rather close sleeper spacing.

“ 19. Neither anti-creep devices nor rail anchorages to the formation appear to be necessary to avoid creep of long rails.

“ 20. The sleeper spacing at welded joints can be the same as in the centre of the rails.

“ 21. In station sidings, rails up to 330 ft. long can be laid in the ordinary way and no special precautions are necessary in regard to the attachment to sleepers or the fishing at joints.

“ 22. In tunnels, where temperature variations are small, the rails can be welded from one end to the other. There does not seem to be any need to employ gradually reducing lengths of rail between the long welded lengths and the normal track in the open.

“ 23. The material and the cross section of the ballasting of tracks with long welded rails is of great importance; to preserve alignment, particularly on curves, a good shoulder of ballast at the ends of the sleepers is essential.

“ 24. Some systems have already carried out tests in the open with rail lengths of several hundred yards, and obtained encouraging results; it is most desirable that such tests should be continued on a wide scale. The elimination of impact at rail joints is certainly a source of considerable economy both in maintenance of track and rolling stock, it also adds considerably to comfort. The use of long rails also gives the advantage of facilitating the staggering of joints.

“ 25. It should be possible in the near future to determine from experience the type of joint to be employed for joining long rail lengths together, or connecting these to junction work and insulated block joints, etc.

“ 26. Theoretical studies and the tests which have been made give varying results for the stresses in the rail and the resistance of the track as a whole to these forces. It would be advantageous if these studies and experiments were continued on a uniform basis with common and well defined terms, so that the results could be easily compared. These should be concentrated on the actual stresses in the rails at different temperatures with different types of track. It would also be useful to find out by experiment the maximum resistance which different types of permanent way and ballast can develop against movement as a result of the stresses in the rail. Such studies and tests should enable a decision to be made as to the best temperature at which long rails should be laid.

## THIRD PART.

## Rail gaps in relation to temperature.

« 27. The general experience acquired is that the gaps between rails can be less than those theoretically calculated on a free expansion basis—in fact they can be reduced to a half or even less. The more the type of track resists creep, the smaller the gap can be.

« 28. Unless special arrangements are made for the joint, this is a weak point in the track which may be the focal point of a buckle. It is therefore important that the space allowed for expansion, having regard to the type of track concerned, is not all taken up at too low a temperature, otherwise there is risk that excessive forces will arise in the rail. In the course of maintenance work, and particularly before the first hot weather of the year, the rail gaps could be restored to normal. Examination should be made to ensure the fishplates will allow the rail ends to move freely. This might involve for example the unscrewing or the screwing up of the fishbolts.

« It is, however, permissible to allow some tolerance in the gaps compared to that provided at the time of laying.

« 29. Checking of joint gaps should be done at times of day when the temperature is not particularly high. »

— The Plenary Meeting held on September 29th ratified these Summaries.

## QUESTION III.

New technical methods adopted for the design and construction of large marshalling yards.

## Lay-out and equipment:

site and importance of siding groups; lay-out of connections at entrance to groups; longitudinal and cross sections; braking installations (Retarders); control of point (switch) operation; telecommunications; lighting; staff buildings, etc.

## Preliminary documents.

Report (Denmark, France and Colonies, Italy, Luxemburg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by MARCHAND. (See *Bulletin*, April 1950, p. 363 or separate issue No. 8.)

Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by J. VAN RIJN. (See *Bulletin*, April 1950, p. 431 or separate issue No. 10.)

Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by J. I. CAMPBELL and J. W. WATKINS. (See *Bulletin*, April 1950, p. 483 or separate issue No. 12.)

*Special Reporter* : M. MARCHAND. (See *Bulletin*, October 1950, p. 2028.)

## Report of Section I.

(See *Daily Journal of the Session*, No. 1, p. 11; No. 6, p. 2 to 6; No. 7, p. 1; No. 8, p. 1.)

**Meeting held on October 2nd, 1950.**

The PRESIDENT asked M. DUBUS, *Principal Secretary*, to read the summaries of the special report prepared by M. l'Ingenieur en Chef MARCHAND.

**General.**

*Summary No. 1 :*

1. The methods adopted in the design and construction of marshalling yards are based on the fundamental principles laid down at the Congresses of London (1925) and Madrid (1930); they aim at increasing efficiency, reducing costs and enlarging shunting capacity by the application of « mechanisation » and the planning of rational lay-outs and profiles.

— Agreed without discussion.

*Summary No. 2 :*

2. Each new scheme presents a particular problem, from the points of view of cost of construction and economy in working. It is desirable that the study of schemes should be advanced as far as possible by competent staff of the department responsible for operations, before constructional plans are prepared (commenced).

With regard to the second and last sentences, M. RENDA (*Chemins de fer de l'Etat, Italie*) stated that the conception of the preliminary study was not the same on all systems, and asked that more general terms should be adopted.

M. MARCHAND, *Special Reporter*, replied that the basic idea in the text was to bring in the Operating Department in the preliminary consideration of the project.

M. CLAUDON, *President*, suggested replacing « operating department » by « using department ». This modification satisfied M. RENDA, and the text was adopted.

*Summary No. 3 :*

3. The modernisation of existing yards, often situated in congested areas, may present difficulties of realisation owing to the want of available space.

— Agreed without discussion.

*Summary No. 4 :*

4. The construction of new yards involves the finding of suitable sites from the point of view of superficial area and contour; when the sites selected are remote from populated areas, it is necessary to consider means of transport and housing accommodation for staff.

Mr. BARRINGTON-WARD (*British Railways*) drew the Reporter's attention to the importance of locomotive depots, which are of necessity comprised in large marshalling yard schemes, and pointed out that such depots are very costly.

M. MARCHAND considered that this dealt with another aspect of the question which he had studied elsewhere, and that he was above all interested in the above report in the problem of communications. However, to satisfy Mr. BARRINGTON-WARD, it was suggested that *Summary No. 4* should be modified as follows :

« 4. The construction of new yards and, eventually, of the necessary locomotive depots, involves the finding of suitable sites from the point of view of superficial area and contour; when the sites selected are remote from populated areas, it is necessary to consider means of transport, and housing accommodation for staff. »

— *Summary No. 4*, amended accordingly, was adopted.

***Summary No. 5 :***

5. Except where special cases or local circumstances render all other solutions impracticable, the construction of double yards, comprising two yards, side by side, each dealing with an opposing flow of traffic, is justified only when the number of vehicles to be dealt with exceeds the capacity of a single hump yard.

— Agreed without discussion.

***Summary No. 6 :***

6. Yards on the gravitation principle, wholly or partially, are only constructed where a suitable profile exists.

At the request of Mr. TRAIN (*British Railways*) the text of Summary No. 6 was altered, the words « or can be made » were added, and the following final text was adopted :

« Yards on the gravitation principle, wholly or partially, are only constructed where a suitable profile exists or can be made. »

**Location of groups  
of sidings and connecting lines.**

***Summary No. 7 :***

7. In addition to reception and sorting groups, which are usually laid out in sequence, large yards should have separate marshalling and departure groups, also « recess » facilities as necessary.

From the point of view of operating convenience, and expeditious transfer movements of vehicles, it is recommended that the following be provided :

— departure groups in continuation of the sorting group;

— marshalling group and recess lines at the sides of the sorting group.

Asked by Mr. BARRINGTON-WARD as to what was meant in the English text by the word « recess », M. MARCHAND

explained that a « faisceau de relais » (storage and lay-by sidings) had two purposes :

reception of trains changing engines and inspecting wagons;

eventual picking up and dropping of wagons.

This was noted and with the exception of the alteration in the English translation, it was agreed to retain the original French text.

***Summary No. 8 :***

8. The number of sidings in the different groups and their effective length are decided by the department responsible for operating, according to service requirements, taking into consideration future developments and having regard to the space available.

— Agreed without discussion.

***Summary No. 9 :***

9. The arrangements of communicating and connecting lines, and the siting of the leads of the groups of sidings should be studied with the object of facilitating the movement of trains and locomotives so as to reduce to the absolute minimum interference between trains, locomotives and shunting operations. In these circumstances constructional works should be undertaken in order to eliminate the more restrictive cross-movements.

— Agreed without discussion.

***Summary No. 10 :***

10. The risk of interference between shunting operations and trains can be appreciably reduced by the provision of independent facilities; at large yards the provision of direction reversing loops or equivalent facilities permits, in conjunction with the use of departure groups, of one-way working which facilitates operation.

— Agreed without discussion.

*Summary No. 11 :*

11. The layout at the heads of the groups of sidings should be as simple as possible in order to reduce the length of shunt.

The provision of double humping lines at the same level enables an appreciable reduction to be made in the length of the head of the reception lines nearest to the hump; it also affords the possibility of more continuous shunting when two humping locomotives are employed.

On the other hand humping lines at different levels (winter and summer) have the disadvantage of lengthening the layout and the length of shunt. Moreover they are unnecessary when the yard is equipped with rail brakes.

With regard to the second paragraph Mr. ROSTERN (*British Railways*) considered that continuous shunting could be carried out just as easily with a single line over the hump.

M. MARCHAND, supported by M. RIGGIO (*Chemins de fer de l'Etat, Italie*), pointed out the benefit of having two lines over the hump :

- a shortening of the head of the siding group;
- continuous shunting;
- maintenance of the track without interfering with shunting.

It was agreed to adopt the original French text, the necessary alterations being made in the English text.

*Summary No. 12 :*

12. Subsidiary facilities should be incorporated for holding brake vans, locomotives, for the rapid repairs to vehicles and for re-adjusting displaced loads. These installations should facilitate working, but their existence should not, in any case, constitute a source of slowing down the flow of the sorting and geographical marshalling operations.

Mr. BARRINGTON-WARD expressed the fear that the expression « holding brake vans and locomotives » suggested excessive delay. M. MARCHAND stated that there was no question of vehicles standing more than a few minutes.

M. CLAUDON, *President*, pointed out that the end of the sentence « but their existence should not in any case constitute a source of slowing-down the flow of the sorting and geographical marshalling operations », confirmed the above and with the exception that the word « holding » in the English text was altered to « accommodating » the text was agreed in its original form.

**Construction (layouts, levels, profiles).***Summary No. 13 :*

13. It is recommended that the heads of siding groups should be very compact, adopting for the layout curves of minimum radius compatible with free movement of locomotives and vehicles.

It is advisable to use for this purpose specially designed permanent way, particularly short symmetrical two-way leads.

— Agreed without discussion.

*Summary No. 14 :*

14. It is desirable that in the body of the groups the sidings should be of straight alignment; the distance between sidings is determined so as to ensure the safety of staff working in the spaces between them.

— Agreed without discussion.

*Summary No. 15 :*

15. Considerations of economy in installation and maintenance generally justify the use of recovered serviceable rails in the body of the siding groups and new rails of the

type standard for main lines in the heads of the groups. In order to reduce the number of joints, rails in the body of the sidings are sometimes welded.

— Adopted without remark.

#### *Summary No. 16 :*

16. Ballast, the nature of which depends upon local or other sources of supply, is generally placed on an underbed of permeable material. When the nature of the group necessitates it, a drainage system ensures the removal of surface water.

In track circuited areas, particular attention should be paid to ballast and drainage.

— Agreed without discussion.

#### *Summary No. 17 :*

17. The reception group is constructed on a fairly level gradient, a short rising gradient approaching the hump being provided in order to permit the uncoupling of vehicles.

It is possible, in order to avoid earthworks, to allow an appreciable gradient between the reception group and the hump without however exceeding the capacity of the locomotives employed for hump shunting.

Mr. CAMPBELL (*British Railways*) asked that the word « avoid » in the first sentence of the second paragraph should be altered to « reduce ». This suggestion was accepted.

— *Summary No. 17*, duly amended, was adopted.

#### *Summary No. 18 :*

18. The relative levels of the hump and the sorting groups depend upon the drop necessary to ensure under all conditions the separation of vehicles by gravity.

— Agreed without discussion.

#### *Summary No. 19 :*

19. In order to ensure rapid separation of cuts, the radius of the vertical curve of the hump should be small; further the profile between the hump and the head of the sorting group should be hollow and should include a steep initial gradient.

After this gradient, the profile should be such as to ensure in all instances adequate spacing of vehicles up to the braking zone. The brakes are established on a falling gradient in order to liberate easily vehicles which may have been stopped there.

— Adopted without remark.

#### *Summary No. 20 :*

20. The switching area beyond the rail-brakes should be on the level or on a slightly falling gradient — the gradient being then sufficiently reduced to prevent acceleration of good running vehicles.

Such a profile may permit, with experienced brake operators, of increasing the rate of shunting because it is necessary that the vehicles should have an appreciable velocity at the outlet from the brakes, with the object of increasing the distance between successive cuts, thus reducing the risk of overtaking.

An exchange of views took place on the subject of the provision in the switching area beyond the rail-brakes of a length on the level or on a slightly falling gradient. Messrs. ROSTERN, PARKHOUSE (*British Railways*) and WATKINS, *Reporter*, advocated a gradient which is usual in England (bad rolling wagons with grease boxes).

M. MARCHAND stressed that certain European countries which had gone deeply into the question of marshalling yards frequently provide level zones. Then the PRESIDENT considered that the Reporter's text was well chosen, and to give satisfaction to the English delegates,

supported by M. GOURSAT (*Société Nationale des Chemins de fer français*), he proposed to modify the original rendering as follows :

« The switching area beyond the rail-brakes should be on a slightly falling gradient or on the level — the gradient being then sufficiently reduced to prevent acceleration of good running vehicles.

« A level profile may permit, with experienced brake operators, of increasing the rate of shunting because it is necessary that the vehicles should have an appreciable velocity at the outlet from the brakes, with the object of increasing the distance between successive cuts, thus reducing the risk of overtaking. »

— *Summary No. 20* amended as indicated was approved.

#### *Summary No. 21 :*

21. It is recommended that the longitudinal profile of the sorting group should be hollowed — the ends presenting suitable gradients intended to facilitate the running of vehicles without risk of inopportune acceleration.

Steeper gradients should be provided on the outer sidings in order to compensate for curve resistance — the cross profile being thus slightly cambered.

With regard to the first paragraph Mr. BARRINGTON-WARD wished to modify the idea that the longitudinal profile of the sorting group should be hollowed.

M. MARCHAND was in agreement with specifying that the falling gradients should be slight.

Agreement was reached on the fol-

lowing modified text proposed for the 1st paragraph by the PRESIDENT :

« It is recommended that the longitudinal profile of the sorting group should be slightly hollowed — the ends presenting suitable gradients intended to facilitate the running of vehicles without risk of inopportune acceleration. »

— *Summary No. 21* amended accordingly was approved.

#### **Railbrake and switching control.**

##### *Summary No. 22 :*

22. The technical development of equipment at large marshalling yards has been characterised in recent years by the increased use of railbrakes.

The design of railbrakes has been improved, in order to facilitate maintenance and reduce costs correspondingly, and, in certain countries, to overcome difficulties resulting from important variations in the width of wheel tyres.

— Agreed without discussion.

##### *Summary No. 23 :*

23. With the object of keeping down the cost of equipment, it is possible to be satisfied with the installation of one set of rail-brakes both for interval and distance braking; each railbrake generally serving a fan of eight sidings.

— Agreed without discussion.

##### *Summary No. 24 :*

24. In installations of this type, the rail-brakes can be operated by one man, located at the side at the head of the sorting group; supplementary braking of vehicles which have not been retarded sufficiently by the railbrakes is effected by means of either hand brakes on the vehicles, or by shoes

manually placed, or possibly by mechanically operated shoes.

— Agreed without discussion.

*Summary No. 25 :*

25. The movement of switches by quick acting motors controlled by track circuit or other equivalent apparatus, facilitates the work of the switch operators; it enables economies in staff to be made and increases the shunting capacity of the yards.

— Agreed without discussion.

*Summary No. 26 :*

26. Apparatus for the automatic control of switch operation enables the rate of shunting to be increased. Their employment has become general and it has even been extended to yards not equipped with railbrakes.

— Agreed without discussion.

*Summary No. 27 :*

27. Automatic switch control must enable the routes of several wagons to be recorded; it can be applied either at the head only of the switching area or throughout. In the latter instance, it is possible to dispense with a switching operator for the sorting sidings provided that devices can be incorporated to avoid incorrect routing of succeeding cuts in the event of one cut overtaking another.

— Agreed without discussion.

*Summary No. 28 :*

28. Some Administrations include in the automatic switch operation system a storage apparatus which enables successive routes for the different cuts to be stored before the commencement of shunting.

With regard to this summary M. MARCHAND stated that certain Administrations, particularly in Great Britain and in France, did not seem to be very favourable to the idea of developing an

automatic switch operating system with storage apparatus.

Mr. BARRINGTON-WARD regretted that it had not been found possible to produce a balance sheet showing the economies obtained by the use of mechanisation.

M. MARCHAND had not received any data for the preparation of such a balance sheet which would have to take into account the fact that mechanisation makes it possible to obtain at peak periods a higher rate of shunting (150-200 wagons per hour with mechanisation against 100 wagons per hour without mechanisation). He considered that the use of mechanisation might be advisable in marshalling yards where a high hourly output is required.

Mr. BARRINGTON-WARD returning to the subject of a balance sheet said that this might be studied at a future Congress.

— Finally it was agreed that the original text of *Summary No. 28* should be adopted without modification.

**Auxiliary equipment**  
(Communications, lighting, buildings).

*Summary No. 29 :*

As suggested by Mr. WATKINS, the text of this Summary was modified as follows :

29. Electrically controlled indicators or teletype apparatus enable hump posts to indicate to the brake operator, and simultaneously to the switch operator, where employed, the destination and the nature of each cut; in certain instances such apparatus has avoided the necessity for the preparation of « cut » lists.

*Summary No. 30 :*

30. Out-door loud speakers are the most practical and most used means for the transmission of orders to the yard staff; « talk-back » loud-speakers give the same facilities by means of two-way communication.

Liaison between the shunting control points and the yard staff can likewise be effected by means of portable radio apparatus.

— Agreed without discussion.

*Summary No. 31 :*

31. Communications between shunting control posts and humping locomotives are usually given by mechanical signal or for preference by the illuminated type of signal.

These signals should be repeated as necessary, either in elongated yards or in those yards worked by two locomotives.

At certain modern yards these signals are substituted by apparatus in the driving cab of the shunting locomotives, cab signals, carrier waves, or radio.

An exchange of views between Messrs. BARRINGTON-WARD, WATKINS, CAMPBELL and MARCHAND took place on the subject of the use respectively of coloured signals and white signals.

M. MARCHAND made it known that the majority of countries use non-coloured signals.

Mr. CAMPBELL then suggested changing the word « substituted » in the last paragraph to « supplemented », also minor alterations in the second paragraph.

— Agreement was reached on the modified text of *Summary No. 31* as given hereafter.

*Summary No. 32 :*

32. Wireless, which can be « one-way » or preferably « two-way » is developing pro-

gressively because it affords more complete and precise inter-communication.

It appears desirable in order to provide for the future, that the Railway Administrations should have the necessary wavelengths allocated to them by the appropriate authorities.

With regard to radio communications, Mr. BARRINGTON-WARD, supported by Mr. RUDGARD (*British Railways*), considered it preferable that, as things are at present, the engine driver should always have a visual signal.

Mr. CAMPBELL considered that the substitution of the word «supplemented» in place of « substituted » in the preceding summary made this matter clear in this respect.

— The text of *Summary No. 32* was adopted without modification.

*Summary No. 33 :*

33. The economy of night operation depends upon the character of the illumination provided; this should receive special attention in the zones of intensive shunting or of movements in the zones of centralised switch and brake control posts.

Except in the case of yards subject to frequent fog it is advantageous to use powerful lights fixed at a considerable height; oblique lighting (floodlighting) by projectors enables a reduction to be made in the number of supports and to place them outside the siding groups.

Mr. BARRINGTON-WARD, supported by WATKINS, was of the opinion that flood lighting did not give complete satisfaction, particularly in areas subject to fog, and that he preferred spot-lighting which is more suitable for operating requirements.

M. MARCHAND stated that the majority of the Administrations had declared

themselves to be quite satisfied with flood lighting. To take into account climatic conditions, particularly of British Railways, he suggested modifying the text of the 2nd. paragraph of the Summary as follows :

« Many Administrations consider that, except in the case of yards subject to frequent fog... »

— *Summary No. 33*, amended as indicated, was adopted.

#### *Summary No. 34 :*

34. The control posts for the switches and railbrakes should be sited and arranged in order to ensure the best visibility of the ground; they are generally elevated and provided with large bay windows and awnings.

At the suggestion of Mr. DYER (*British Railways*), supported by Messrs. WATKINS and PARKHOUSE, the text of *Summary No. 34*, was completed in order to stress the general use of illuminated diagrams.

#### *Summary No. 35 :*

35. Apart from the different buildings which it is an advantage to group, each yard requires a principal administrative and control building which is generally installed at the main centre of operation.

— Agreed without discussion, except that Mr. BARRINGTON-WARD suggested that « control building » in the fourth line should read « supervisory building ».

On the subject of this summary, M. MARCHAND, stated that formerly one understood by the expression *main centre of operations*, the humping area, and that in modern yards the centre of operations is at the formation sidings.

The PRESIDENT stated that the following Summaries were adopted :

### SUMMARIES.

#### *General.*

« 1. The methods adopted in the design and construction of marshalling yards are based on the fundamental principles laid down at the Congresses of London (1925) and Madrid (1930); they aim at increasing efficiency, reducing costs and enlarging shunting capacity by the application of « mechanisation » and the planning of rational lay-outs and profiles.

« 2. Each new scheme presents a particular problem, from the points of view of cost of construction and economy in working. It is desirable that the study of schemes should be advanced as far as possible by competent staff of the using department before constructional plans are prepared (commenced).

« 3. The modernisation of existing yards, often situated in congested areas, may present difficulties of realisation owing to the want of available space.

« 4. The construction of new yards and, eventually, of the necessary locomotive depots, involves the finding of suitable sites from the point of view of superficial area and contour; when the sites selected are remote from populated areas, it is necessary to consider means of transport, and housing accommodation for staff.

« 5. Except where special cases or local circumstances render all other

« solution impracticable, the construction of double yards, comprising two yards, side by side, each dealing with an opposing flow of traffic, is justified only when the number of vehicles to be dealt with exceeds the capacity of a single hump yard.

« 6. Yards on the gravitation principle, wholly or partially, are only constructed where a suitable profile exists or can be made.

*Location of groups of sidings and connecting lines.*

« 7. In addition to reception and sorting groups, which are usually laid out in sequence, large yards should have separate marshalling and departure groups, also storage and lay-by facilities as necessary.

« From the point of view of operating convenience, and expeditious transfer movements of vehicles, it is recommended that the following be provided:

« departure groups in continuation of the sorting group;

« marshalling group and recess lines at the sides of the sorting group.

« 8. The number of sidings in the different groups and their effective length are decided by the department responsible for operating, according to service requirements, taking into consideration future developments and having regard to the space available.

« 9. The arrangement of communicating and connecting lines, and the siting of the leads of the groups of sidings should be studied with the

« object of facilitating the movement of trains and locomotives so as to reduce to the absolute minimum interference between trains, locomotives and shunting operations. In these circumstances constructional works should be undertaken in order to eliminate the more restrictive cross-movements.

« 10. The risk of interference between shunting operations and trains can be appreciably reduced by the provision of independent facilities; at large yards the provision of direction reversing loops or equivalent facilities permits, in conjunction with the use of departure groups, of one way working which facilitates operation.

« 11. The layout at the heads of the groups of sidings should be as simple as possible in order to reduce the length of shunt.

« The provision of two lines over the hump at the same level enables an appreciable reduction to be made in the length of the head of the reception lines nearest to the hump; it also affords the possibility of more continuous shunting when two humping locomotives are employed.

« On the other hand humping lines at different levels (winter and summer) have the disadvantage of lengthening the layout and the length of shunt. Moreover they are unnecessary when the yard is equipped with railbrakes.

« 12. Subsidiary facilities should be incorporated for accommodating brake vans, locomotives, for the rapid repairs to vehicles and for re-adjusting displaced loads. These installations

“ should facilitate working, but their existence should not, in any case, constitute a source of slowing down the flow of the sorting and geographical marshalling operations.

#### *Construction (Layouts, levels, profiles).*

“ 13. It is recommended that the heads of siding groups should be very compact, adopting for the layout curves of minimum radius compatible with free movement of locomotives and vehicles.

“ It is advisable to use for this purpose specially designed permanent way, particularly short symmetrical two-way leads.

“ 14. It is desirable that in the body of the groups the sidings should be of straight alignment; the distance between sidings is determined so as to ensure the safety of staff working in the spaces between them.

“ 15. Considerations of economy in installation and maintenance generally justify the use of recovered serviceable rails in the body of the siding groups and new rails of the type standard for main lines in the heads of the groups. In order to reduce the number of joints, rails in the body of the sidings are sometimes welded.

“ 16. Ballast, the nature of which depends upon local or other sources of supply, is generally placed on an underbed of permeable material. When the nature of the group necessitates it, a drainage system ensures the removal of surface water.

“ In track circuited areas, particular

“ attention should be paid to ballast and drainage.

“ 17. The reception group is constructed on a fairly level gradient, a short rising gradient approaching the hump being provided in order to permit the uncoupling of vehicles.

“ It is possible, in order to reduce earthworks, to allow an appreciable gradient between the reception group and the hump without however exceeding the capacity of the locomotives employed for hump shunting.

“ 18. The relative levels of the hump and the sorting groups depend upon the drop necessary to ensure under all conditions the separation of vehicles by gravity.

“ 19. In order to ensure rapid separation of cuts, the radius of the vertical curve of the hump should be small; further the profile between the hump and the head of the sorting group should be hollow and should include a steep initial gradient.

“ After this gradient, the profile should be such as to ensure in all instances adequate spacing of vehicles up to the braking zone. The brakes are established on a falling gradient in order to liberate easily vehicles which may have been stopped there.

“ 20. The switching area beyond the railbrakes should be on a slightly falling gradient or on the level — the gradient being then sufficiently reduced to prevent acceleration of good running vehicles.

“ A level profile may permit, with experienced brake operators, of in-

« creasing the rate of shunting because  
« it is necessary that the vehicles should  
« have an appreciable velocity at the  
« outlet from the brakes, with the object  
« of increasing the distance between  
« successive cuts, thus reducing the risk  
« of overtaking.

« 21. It is recommended that the  
« longitudinal profile of the sorting  
« group should be slightly hollowed —  
« the ends presenting suitable gradients  
« intended to facilitate the running of  
« vehicles without risk of inopportune  
« acceleration.

« Steeper gradients should be pro-  
« vided on the outer sidings in order to  
« compensate for curve resistance — the  
« cross profile being thus slightly cam-  
« bered.

#### *Railbrake and switching control.*

« 22. The technical development of  
« equipment at large marshalling yards  
« has been characterised in recent years  
« by the increased use of railbrakes.

« The design of railbrakes has been  
« improved, in order to facilitate main-  
« tenance and reduce costs correspond-  
« ingly, and, in certain countries, to  
« overcome difficulties resulting from  
« important variations in the width of  
« wheel tyres.

« 23. With the object of keeping  
« down the cost of equipment, it is pos-  
« sible to be satisfied with the installa-  
« tion of one set of railbrakes both for  
« interval and distance braking; each  
« railbrake generally serving a fan of  
« eight sidings.

« 24. In installations of this type, the  
« railbrakes can be operated by one  
« man, located at the side at the head  
« of the sorting group; supplementary  
« braking of vehicles which have not  
« been retarded sufficiently by the rail-  
« brakes is effected by means of either  
« hand brakes on the vehicles, or by  
« shoes manually placed, or possibly by  
« mechanically operated shoes.

« 25. The movement of switches by  
« quick acting motors controlled by  
« track circuit or other equivalent appa-  
« ratus, facilitates the work of the switch  
« operators; it enables economies in staff  
« to be made and increases the shunting  
« capacity of the yards.

« 26. Apparatus for the automatic  
« control of switch operation enables the  
« rate of shunting to be increased.  
« Their employment has become general  
« and it has even been extended to yards  
« not equipped with railbrakes.

« 27. Automatic switch control must  
« enable the routes of several wagons  
« to be recorded; it can be applied either  
« at the head only of the switching area  
« or throughout. In the latter instance,  
« it is possible to dispense with a switch-  
« ing operator for the sorting sidings  
« provided that devices can be incor-  
« porated to avoid incorrect routing of  
« succeeding cuts in the event of one cut  
« overtaking another.

« 28. Some Administrations include  
« in the automatic switch operating sys-  
« tem a storage apparatus which enables  
« successive routes for the different cuts  
« to be stored before the commencement  
« of shunting.

*Auxiliary equipment**(communications, lighting, buildings).*

« 29. Electrically controlled indicators or teletype apparatus enable hump posts to indicate to the brake operator, and simultaneously to the switch operator, where employed, the destination and the nature of each cut; in certain instances such apparatus has avoided the necessity for the preparation of « cut » lists.

« 30. Out-door loud speakers are the most practical and most used means for the transmission of orders to the yard staff; « talk-back » loud-speakers give the same facilities by means of two-way communication.

« Liaison between the shunting control points and the yard staff can likewise be effected by means of portable radio apparatus.

« 31. Communications between shunting control posts and humping locomotives are usually given by mechanical signal or for preference by the illuminated type of signal.

« These signals should be repeated as necessary in elongated yards and in those yards worked by two locomotives.

« At certain modern yards these signals are supplemented by apparatus in the driving cab of the shunting locomotives, cab-signals, carrier waves, or radio.

« 32. Wireless, which can be « one-way » or preferably « two-way » is developing progressively because it affords more complete and precise intercommunication.

« It appears desirable in order to provide for the future, that the Railways Administrations should have the necessary wavelengths allocated to them by the appropriate authorities.

« 33. The economy of night operation depends upon the character of the illumination provided; this should receive special attention in the zones of intensive shunting or of movements in the zones of centralised switch and brake control posts.

« Many administrations consider that, except in the case of yards subject to frequent fog, it is advantageous to use powerful lights fixed at a considerable height; oblique lighting (flood-lighting) by projectors enables a reduction to be made in the number of supports and to place them outside the siding groups.

« 34. The control posts for the switches and railbrakes, which are always provided with illuminated diagrams, should be sited and arranged in order to ensure the best visibility of the ground; they are generally elevated and provided with large bay windows and awnings.

« 35. Apart from the different buildings which it is an advantage to group, each yard requires a principal administrative and supervisory building which is generally installed at the main centre of operation. »

— The Plenary Meeting held on October 4th ratified these Summaries.

\* \* \*

*After reaching agreement on the Summaries of Question III, there was a general discussion on a number of different points:*

1. — M. MARCHAND, *Special Reporter*, referring back to *Summary No. 31*, pointed out that in the present state of development, radio communication could not be used by itself and that it should be supplemented by visual signalling.

Mr. RUDGARD thought that if the time ever arrived when visual signalling could be dispensed with it would be desirable to record all instructions in the driving cab of the engine.

Mr. DYER considered that it would be possible, by means of track circuiting, to instal luminous signals in the driving cabs of the engines; this would be preferable to verbal communication. Mr. WATKINS agreed with this view.

M. MARCHAND thought that at the present time it was not possible to express any decided preference, however, he did not see any great objection to instructions being given verbally to engine drivers in marshalling yards where no major question of safety was involved.

M. CLAUDON, *President*, emphasised that if at a later date radio communica-

tion should be more widely used there must be a definite indication to the driver that all instructions had been duly communicated to him.

2. — M. MARCHAND remarked that in his special report he had considered future developments and drew attention to the following points :

track brakes are very costly; if it is considered they should be developed it will be necessary to consider systems that are simpler and less costly;

a reduction of the personnel in the sorting group is necessary; the use of brakemen is onerous and their task is dangerous. The technique in this respect could be improved;

experiments being carried out by certain Administrations, particularly in America, for weighing wagons while passing over the hump, should be followed with interest.

On this subject M. Boot (*Netherlands Railways*) stated that the installation of weigh bridges at the hump at Amsterdam, combined with the inspection of wagons at the foot of the hump, presented considerable difficulties.

*The meeting closed at 11.35 a. m.*

## **SECTION II. — Locomotives and rolling stock.**

*President : LORD HURCOMB.*

*Vice-Presidents : G. TURELL, S. GIALISTRAS.*

*Principal Secretary : F. UYTBORCK.*

### **QUESTION IV.**

The comfort of passengers in coaches, railcars and electric motor coaches : sound proofing; lighting; heating, air conditioning, ventilation, thermic isolation; upholstery; running stability (type of bogie and suspension).

#### **Preliminary documents.**

Report (Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by O. G. WEBERG. (See *Bulletin*, May 1950, p. 931, separate issue No. 20.)

Supplement to Report by O. WEBERG. (See *Bulletin*, September 1950, p. 1995.)

Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by E. F. LOQUET. (See *Bulletin*, July 1950, p. 1597, separate issue No. 33.)

Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by M. MARTINELLI. (See *Bulletin*, September 1950, p. 1861, separate issue No. 37.)

*Special Reporter : M. MARTINELLI. (See Bulletin, October 1950, p. 2042.)*

#### **Report of Section II.**

(See *Daily Journal of the Session*, No. 2, p. 7 to 11; No. 3, p. 5 to 6; No. 5, p. 2.)

**Meeting held on September 26th 1950.**

The PRESIDENT called upon M. MARTINELLI (*Special Reporter*), to read the conclusions of his special report.

M. MARTINELLI dealt first with the Summaries of Chapter :

#### **A). Sound insulation.**

##### **Summary No. 1 :**

1. The experiments carried out by different railways prove that elastic wheels do not lead to any appreciable improvements from the point of view of the sound insulation of vehicles. Such types of wheels can even be the source of parasitic vibrations in themselves.

M. CHAN (*Société Nationale des Chemins de fer français*) asked if this applied to all vehicles, including stock of light construction, or to heavy vehicles only. The S. N. C. F. had experience with resilient wheels on 150 HP light railcars and as regards both comfort and reduction of noise their experience had seemed favourable.

M. MARTINELLI stated that the information given by the various Administrations agreed in stating that resilient wheels are used with good results from the point of view that stresses in components are reduced but on the other hand that as regards the reduction of noise, particularly at high speeds, results had not been very notable. It is possible that with slow speed vehicles good results may be obtained in reducing sound, in any case it seems that experience should continue to be gained if only for the purpose of reducing stress.

M. CHAN asked if this conclusion could indicate that there is no noticeable improvement by the use of resilient wheels on fast and heavy vehicles, but on the other hand provides for the possibility of a different conclusion in the case of light vehicles.

M. MARTINELLI pointed out that the conclusion which he has drawn is in total a statistical one, based on the replies of more than 50 % of the Administrations.

M. LOQUET, *Reporter*, considered that the conclusion of the special reporter had been largely inspired by the first sentence of his report which related specifically to the rolling stock of the London Transport Executive. This was high speed rolling stock running in tunnels with frequent and heavy brake applications. For such vehicles it was acknowledged that resilient wheels provided no advantages.

M. MARTINELLI pointed out that the Italian State Railways had also carried out experiments with resilient wheels

without obtaining satisfactory results as regards reduction of noise.

The PRESIDENT, having asked if other members supported the modification requested by M. CHAN, the latter did not pursue his request in view of the agreement in the views expressed by the other Administrations.

— *Summary No. 1* was then adopted without alteration.

#### *Summary No. 2 :*

2. It is possible to reduce the formation of noise by :

- simplifying the brake rigging and doing away with a central rigging;
- providing suitable guides for all the moveable parts of the body;
- covering the body sheets with absorbant substances and reducing the size (area) of sheets used;
- using helicoidal gears in the drive of railcars and ground gears for rail motor coaches.

M. HUG (*Bernese Alps Railway*) stated that there was one point which none of the reporters had mentioned and which in his opinion was of great importance in the reduction of noise. This was the use of light alloys in place of steel in the construction of bodywork. Experience, particularly on mountain lines in Switzerland, had shown that vehicles constructed of light alloy are much less noisy than those of welded steel. Experience had been similar in other countries. In England, the London Transport Executive is at present building ninety coaches for which light alloys have been chosen with the aim of improving sound insulation.

M. CUTTICA (*Italian State Railways*) asked that mention might be made of the possibility of an improvement in sound proofing without making any definite statement on the results to be expected.

M. LOQUET was in favour of adopting a more definite conclusion in view of the fact that the first trials which had been carried out had given good results.

The PRESIDENT proposed that the conclusion should not be modified, but that note should be taken of the further possibility of reducing noise.

— *Summary No. 2* was adopted.

#### *Summary No. 3 :*

3. The use of anti-vibration packings between body and bogie is very widespread. The S. N. C. F. doubt their utility however.

M. PARMANTIER (*Société Nationale des Chemins de fer français*) requested the deletion of the last sentence of this conclusion, this comprising simply a correction regarding the point of view of the S. N. C. F.

— The alteration was adopted without discussion.

— *Summary No. 3* was agreed as follows :

“ 3. The use of anti-vibration packings between body and bogie is very widespread. ”

— The following *Summaries No. 4, 5, 6 and 7* were adopted without discussion.

4. The suspension of the heat engines is always completed by very elastic rubber packings.

5. In the construction of up-to-date rolling stock, extensive use is made of absorbant substances on the walls, floors, ceilings and doors.

Such substances provide satisfactory heat insulation. The latter is completed, in very cold countries, by the use of double windows.

6. There is a tendency to equip railcars with a platform or luggage compartment between the compartments and the driving compartment.

7. The transmission of noise can be reduced by carefully packing the trap-doors in the floors and the holes for the pipes and conduits.

#### B). Lighting.

*Summaries Nos. 1, 2 and 3* were read out by M. MARTINELLI.

1. Up to the present incandescent lamps have been widely used. Fluorescent lighting is now developing very rapidly.

2. At the present time the filaments of incandescent lamps are screened by using either opaque bulbs or opaline diffusers.

3. For some years there has been an appreciable increase in the amount of light provided (90 lux in 1st and 2nd classes; 50 lux in 3rd class at reading level). With equal power installed, the lighting can be tripled approximately by the use of fluorescent tubes.

Mr. DE SOUZA (*Railway Board, India*) stated that in India, trials with fluorescent lighting had been undertaken on one coach, and had not given the desired results. He would like to know if, from the trials they had undertaken, other Administrations could confirm that this type of lighting had been found superior to incandescent lighting.

The PRESIDENT suggested that Mr. DE SOUZA might obtain the information directly from other Administrations. In any case, the conclusion would not be affected by this.

— *Summaries Nos. 1, 2 and 3* were adopted without alteration.

**C). Heating. — Air conditioning. — Ventilation. — Heat insulation.**

*Summaries Nos. 1, 2 and 3 :*

1. With steam heating, there is a general tendency to increase the feed pressure in the main steam pipe in order to improve the heating of the last few vehicles of the train.

2. In the corridors of compartment coaches, the steam or electric radiators are arranged either against the body sides or against the compartment partitions, or in the compartments themselves. Some railways use the actual steam conduit as a radiator for heating the corridors.

3. Direct electric heating by radiators is the most widely used and most economical method. It gives satisfactory results provided the circulation of air around the heating elements is adequate.

— *Summaries Nos. 1, 2 and 3* were adopted without modification.

*Summary No. 4 :*

4. Pulsated air electric heating increases the comfort, and also makes it possible to ventilate the vehicles during the summer. However, the consumption of current in high and low tension is much higher than with direct heating.

M. PARMANTIER wished to know the reason why forced air electric heating should require a greater consumption of energy than direct heating.

M. d'ARBELA (*Italian State Railways*) replied that with forced air heating there is a discharge of warm air to the atmosphere. The air taken in consequently required a higher consumption of energy.

M. MARTINELLI added that in forced air heating it was also necessary to take

into account losses in the ducts and, moreover, that consumption of energy at low tension is much greater than with direct heating.

He proposed that the text of the conclusion should remain.

— *Summary No. 4* was adopted.

*Summary No. 5 :*

5. The compartments are generally heated individually, with thermostatic control.

M. PARMANTIER reported that, in general, the S.N.C.F. used only one or two thermostats per coach and asked if other Administrations had already used thermostatic control for each compartment.

M. MARTINELLI reported that this was the general method.

M. d'ARBELA stated that the Italian Railways had adopted one single thermostat on existing international coaches but in new coaches of this type they had preferred the provision of thermostatic control for each compartment.

The PRESIDENT remarked that the English text did not agree with the French text, this conclusion in English should read :

“ 5. There is a general tendency to adopt heating of compartments individually, with thermostatic control. »

— *Summary No. 5* was adopted.

*Summary No. 6 :*

6. In railcars, heating by the engine cooling water or exhaust gases does not usually give sufficient comfort. On both vehicles and trailers the present tendency is towards the

use of coal or oil systems of heating. In the latter case, the working can easily be made automatic.

— Adopted.

*Summary No. 7 :*

7. Coaches not equipped with air conditioning or pulsated air heating are nearly always equipped with ventilators in the ceilings or walls. A few applications of forced ventilation have also been carried out.

— Adopted.

*Summary No. 8 :*

8. Air conditioning is in general use in the U.S.A. and in tropical countries. In Europe, it has only been tried to a very limited extent.

— Adopted.

*Summary No. 9 :*

9. In coaches equipped with air conditioning with cooling equipment, use is always made of double fixed windows.

— Adopted.

**D). Fittings.**

*Summary No. 1 :*

1. In coaches of European construction, the seats always face each other, whilst in America, Australia and Africa they often face in the same direction, and can generally be reversed and have adjustable backs.

M. PARMANTIER stated that the S. N. C. F. were using, experimentally, coaches with adjustable and reversible seats.

M. D'ARBELA observed that the use of such seats in Europe did not seem very suitable in view of the short distances between terminal stations and the frequent change of direction of trains.

M. PARMANTIER proposed the addition of the following sentence to *Summary No. 1* : « It may, however, be noted that trials are being undertaken in Europe with adjustable and reversible seats. »

— This proposal was accepted and *Summary No. 1*, duly amended, was adopted.

*Summary No. 2 :*

2. In Europe, springs and hair are used to upholster the seats. In America, Australia and Africa, sponge rubber is also used.

— *Summary No. 2* was adopted without modification.

*Summary No. 3 :*

3. The use of leather or similar synthetic products has been greatly extended for seat coverings, except in cold countries and in Europe, where textile materials are still widely used.

At the request of M. PARMANTIER the conclusion was modified as follows : « and in Europe, where, particularly in first and second classes, textile materials are still widely used ».

— *Summary No. 3* amended accordingly was adopted.

*Summary No. 4 :*

4. Head and elbow rests are still used in 1st and 2nd classes.

At the request of M. PARMANTIER, M. MARTINELLI proposed that the text be modified by the addition of « and also in third-class in certain countries ». This proposal was adopted.

— *Summary No. 4* duly completed was adopted.

*Summary No. 5 :*

5. There is a definite tendency to provide upholstered seats in 3rd class, as well as seats that can be turned into berths on coaches making long runs.

— *Summary No. 5* was adopted without discussion.

*Summary No. 6 :*

6. The centre corridor is almost general practice in the case of stopping train coaches, and also for railcars and rail motor coaches.

Mr. PUGSON (*British Railways*) stated that in England in stopping trains there are also non-corridor vehicles. He proposed to add to the text of the conclusion « except British Railways where the practice is to provide central corridor and also non-corridor stock ».

— This proposal to be submitted for approval by the Section at the next meeting.

*Summary No. 7 :*

7. In Europe the main line stock often has a side corridor, whilst in America, the centre corridor is the most common.

— Adopted.

*Summary No. 8 :*

8. In Europe, there are 3 seats a side in 1st class, 4 and sometimes 5 in 3rd class. There are 3 or 4 seats a side in 2nd class.

— Adopted.

*Summary No. 9 :*

9. On railcars and rail motor coaches, and on all the American coaches, there are 4 seats a side.

M. CUTTICA (*Italian State Railways*) having stated that the Italian State Rail-

ways were providing 3 seats a side in railcars to be constructed, proposed the following modification to this conclusion: « 9. In all American coaches and in general in railcars and rail motor coaches there are four seats a side. »

— This amended *Summary No. 9* was adopted.

The following *Summaries Nos. 10, 11, 12, 13 and 14* were adopted without discussion.

10. Plywood or composition material (Masonite) is widely used to cover the walls. Special coverings of plastic materials are also being used.

11. The floors are generally covered with linoleum, and more rarely rubber. These materials are sometimes covered by a carpet in 1st class.

12. The walls of W.C.s are covered with painted, enamelled or vitrified sheets. There are also some examples of rustless steel being used, or plywood covered with plastic materials.

13. The floors of W.C.s are in mosaic or earthenware tiles, in rubber with coverings, special asphalt or cement, or metal grills.

14. Hot water for washbasins in the W.C.s is beginning to be provided more generally, especially during the winter.

M. PARMANTIER mentioned in regard to *Summary No. 11*, however, that on the S. N. C. F. suburban coaches magnesium cement is used with complete satisfaction provided that good quality material is used.

**E). Stability of running.**

The following *Summaries Nos. 1 and 2* were taken together :

1. Most Administrations continue to use the classic types of bogies on their up-to-date stock as previously standardised.

2. Such bogies can be used at high speeds provided special care is taken in the maintenance of the stock and permanent way.

M. PARMANTIER feared that the text of *Summary 2* might give the impression that the use of normal type bogies for high speeds leads to increased expenditure in the up-keep of the track.

M. CHAN also asked if the special conditions regarding track maintenance were not caused rather by the working of locomotives than by the carriage bogies.

After an exchange of views between Messrs. CHAN, MARTINELLI and d'ARBELA, M. PARMANTIER submitted at the request of the PRESIDENT the following text for this summary : « Such bogies can be used for very high speeds provided that special conditions of maintenance are observed for the stock and that the track is in very good state. »

This text will be submitted to the approval of the Section at the next meeting.

#### *Summary No. 3 :*

3. Bogies of special types for ordinary and high speeds have recently been tried and seem likely to be generally used on the future rolling stock of some railways. However, in the design of bogies other factors than the comfort must also be taken into account (cost, weight, ease of maintenance).

#### *Summary No. 4 :*

4. The use of bogies without swing bolsters has been very limited to date, and is not likely to be made general.

— *Sumsaries Nos. 3 and 4* were adopted without discussion.

#### *Summary No. 5 :*

5. An increase in the flexibility of the springs is likely to improve the comfort. It may also be necessary on account of the lightening of rolling stock, plate springs, coiled springs or a combination of the two types remaining current practice. The use of coiled springs is extending compared with that of plate springs.

— *Summary No. 5* was adopted subject to a slight modification to the French text only.

#### *Summary No. 6 :*

6. The use of torsion bars is not very extensive. Rubber is used more and more for auxiliary springs but not often for the main springs.

— *Summary No. 6* was adopted without discussion.

#### *Summary No. 7 :*

7. Some railways check the damping out of the vertical and horizontal oscillations, either by combining different types of springs or by hydraulic shock absorbers.

M. HOFFET (*Chemins de fer fédéraux, Suisse*) stated that on Swiss locomotives Ferodo type friction dampers had not given good results. He asked if similar devices were used on carriages.

M. MARTINELLI replied in the negative and added that such dampers have not a sufficiently smooth operation.

— *Summary No. 7* was adopted without alteration.

#### *Summary No. 8 :*

8. For high speed rolling stock, there is a general tendency to reduce the play in the axle box guides, either by using special materials, or by special designs of guides without play.

— Adopted.

*Summary No. 9:*

9. According to certain railways, the reduction of the coning of tyres makes it possible to improve the comfort by reducing hunting. This measure however results in increased wear of the flanges.

— Adopted.

The PRESIDENT thanked the delegates and Reporters and in particular the Special Reporter for the clarity of his summaries.

— The meeting closed at 11.15 a.m.

**Meeting held on September 27th 1950.**

The PRESIDENT submitted for discussion the proposal made by Mr. PUGSON with regard to *Summary No. 6* of Chapter D, Fittings, and referred to the Report of the meeting of the 26th September, 1950.

— This proposal was accepted in the form shown hereafter :

“ 6. The central corridor is almost general practice in the case of stopping train coaches and also for railcars and rail motor coaches, except on British Railways where the practice is to provide central corridor and also non-corridor stock. ”

With regard to *Summaries Nos. 1 and 2*, of Chapter E, Stability of Running, the new text proposed, and reproduced in the report of the meeting of the 26th September, 1950, was approved subject to the deletion of the word “ very ” in the last line.

— The text of these Summaries is as indicated below :

“ 1. Most Administrations continue

to use the classic types of bogies on their up-to-date stock as previously standardised. ”

“ 2. Such bogies can be used for very high speeds provided that special conditions of maintenance are observed for the stock and that the track is in a good state. ”

— The full text of the summaries adopted is as follows :

**SUMMARIES.****A. Sound insulation.**

“ 1. The experiments carried out by different railways prove that elastic wheels do not lead to any appreciable improvements from the point of view of the sound insulation of vehicles. Such types of wheels can even be the source of parasitic vibrations in themselves.

“ 2. It is possible to reduce the formation of noise by :

“ — simplifying the brake rigging and doing away with a central rigging; “ — providing suitable guides for all the moveable parts of the body; “ — covering the body sheets with absorbant substances and reducing the size (area) of sheets used;

“ — using helicoidal gears in the drive of railcars and ground gears for rail motor coaches.

“ 3. The use of anti-vibration packings between body and bogie is very widespread.

“ 4. The suspension of the heat engines is always completed by very elastic rubber packings.

“ 5. In the construction of up-to-date rolling stock, extensive use is made of absorbant substances on the walls, floors, ceilings and doors.

“ Such substances provide satisfactory heat insulation. The latter is completed, in very cold countries, by the use of double windows.

“ 6. There is a tendency to equip railcars with a platform or luggage compartment between the compartments and the driving compartment.

“ 7. The transmission of noise can be reduced by carefully packing the trapdoors in the floors and the holes for the pipes and conduits.

### B. Lighting.

“ 1. Up to the present incandescent lamps have been widely used. Fluorescent lighting is now developing very rapidly.

“ 2. At the present time the filaments of incandescent lamps are screened by using either opaque bulbs or opaline diffusers.

“ 3. For some years there has been an appreciable increase in the amount of light provided (90 lux in 1st and 2nd classes; 50 lux in 3rd class at reading level). With equal power installed, the lighting can be tripled approximately by the use of fluorescent tubes.

### C. Heating. — Air conditioning. Ventilation. — Heat insulation.

“ 1. With steam heating, there is a general tendency to increase the feed pressure in the main steam pipe in

“ order to improve the heating of the last few vehicles of the train.

“ 2. In the corridors of compartment coaches, the steam or electric radiators are arranged either against the body sides or against the compartment partitions, or in the compartments themselves. Some railways use the actual steam conduit as a radiator for heating the corridors.

“ 3. Direct electric heating by radiators is the most widely used and most economical method. It gives satisfactory results provided the circulation of air around the heating elements is adequate.

“ 4. Pulsated air electric heating increases the comfort, and also makes it possible to ventilate the vehicles during the summer. However, the consumption of current in high and low tension is much higher than with direct heating.

“ 5. There is a general tendency to adopt heating of compartments individually, with thermostatic control.

“ 6. In railcars, heating by the engine cooling water or exhaust gases does not usually give sufficient comfort. On both vehicles and trailers the present tendency is towards the use of coal or oil systems of heating. In the latter case, the working can easily be made automatic.

“ 7. Coaches not equipped with air conditioning or pulsated air heating are nearly always equipped with ventilators in the ceilings or walls. A few applications of forced ventilation have also been carried out.

« 8. Air conditioning is in general use  
« in the U. S. A. and in tropical coun-  
« tries. In Europe, it has only been  
« tried to a very limited extent.

« 9. In coaches equipped with air  
« conditioning with cooling equipment,  
« use is always made of double fixed  
« windows.

#### D. Fittings.

« 1. In coaches of European con-  
« struction, the seats always face each  
« other, whilst in America, Australia  
« and Africa they often face in the same  
« direction, and can generally be revers-  
« ed and have adjustable backs. It  
« may, however, be noted that trials are  
« being undertaken in Europe with  
« adjustable and reversable seats.

« 2. In Europe, springs and hair are  
« used to upholster the seats. In Amer-  
« ica, Australia and Africa, sponge rub-  
« ber is also used.

« 3. The use of leather or similar  
« synthetic products has been greatly  
« extended for seat coverings, except in  
« cold countries and in Europe, where  
« particularly in first and second classes  
« textile materials are still widely used.

« 4. Head and elbow rests are still  
« used in 1st and 2nd classes and also  
« in third class in certain countries.

« 5. There is a definite tendency to  
« provide upholstered seats in 3rd class,  
« as well as seats that can be turned into  
« berths on coaches making long runs.

« 6. The central corridor is almost  
« general practice in the case of stop-

« ping train coaches and also for railcars  
« and rail motor coaches, except on  
« British Railways where the practice is  
« to provide central corridor and also  
« non-corridor stock.

« 7. In Europe the main line stock  
« often has a side corridor, whilst in  
« America, the centre corridor is the  
« most common.

« 8. In Europe, there are 3 seats a  
« side in 1st class, 4 and sometimes 5  
« in 3rd class. There are 3 or 4 seats  
« a side in 2nd class.

« 9. In all American coaches and in  
« general in railcars and in rail motor  
« coaches, there are 4 seats a side.

« 10. Plywood or composition mater-  
« ial (Masonite) is widely used to cover  
« the walls. Special coverings of plastic  
« materials are also being used.

« 11. The floors are generally cover-  
« ed with linoleum, and more rarely  
« rubber. These materials are some-  
« times covered by a carpet in 1st class.

« 12. The walls of W. C.s are cover-  
« ed with painted, enamelled or vitrified  
« sheets. There are also some examples  
« of rustless steel being used, or ply-  
« wood covered with plastic materials.

« 13. The floors of W. C.s are in  
« mosaic or earthenware tiles, in rubber  
« with coverings, special asphalt or  
« cement, or metal grills.

« 14. Hot water for washbasins in the  
« W. C.s is beginning to be provided  
« more generally, especially during the  
« winter.

### E. Stability of running.

« 1. Most Administrations continue to use the classic types of bogies on their up-to-date stock as previously standardised.

« 2. Such bogies can be used for very high speeds provided that special conditions of maintenance are observed for the stock and that the track is in a good state.

« 3. Bogies of special types for ordinary and high speeds have recently been tried and seem likely to be generally used on the future rolling stock of some railways. However, in the design of bogies other factors than the comfort must also be taken into account (cost, weight, ease of maintenance).

« 4. The use of bogies without swing bolsters has been very limited to date, and is not likely to be made general.

« 5. An increase in the flexibility of the springs is likely to improve the comfort: It may also be necessary on account of the lightening of rolling stock, plate springs, coiled springs or a combination of the two types remaining current practice. The use of coiled springs is extending compared with that of plate springs.

« 6. The use of torsion bars is not very extensive. Rubber is used more and more for auxiliary springs but not often for the main springs.

« 7. Some railways check the damping out of the vertical and horizontal oscillations, either by combining different types of springs or by hydraulic shock absorbers.

« 8. For high speed rolling stock, there is a general tendency to reduce the play in the axle box guides, either by using special materials, or by special designs of guides without play.

« 9. According to certain railways, the reduction of the coning of tyres makes it possible to improve the comfort by reducing hunting. This measure however results in increased wear of the flanges. »

### QUESTION V.

**Improvements in the construction of rolling stock (motor and trailer) in view of increasing the mileage between repairs :**  
**solid wheels or with tyres (metal used for the tyres and solid wheels, behaviour in service);**  
**axle boxes;**  
**wearing and friction metals;**  
**springs (qualities, shape, manufacture).**

#### Preliminary documents.

Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by E. PUGSON and L. LYNES. (See *Bulletin* for April 1950, p. 683, or separate issue No. 14.)

Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by A. d'ARBELA and M. FASOLI. (See *Bulletin* for July 1950, p. 1449, or separate issue No. 30.)

Report (Belgium and Colony, Denmark, France and French Union, Luxembourg, Norway, Netherlands and Colo-

nies, Poland, Switzerland and Syria), by M. G. CHAN. (See *Bulletin* for August 1950, p. 1755, or separate issue No. 36.)

*Special Reporter* : G. CHAN. (See *Bulletin*, October 1950, p. 2057.)

### Report of Section II.

(See *Daily Journal of the Session*, No. 3, p. 6 to 8; No. 4, pp. 2/3; No. 5, p. 2.)

### Meeting held on September 27th 1950.

The PRESIDENT called upon M. CHAN, *Special Reporter*, to read *Summary No. 1* of his report.

#### *Summary No. 1 :*

1. *Tyre wear* determines generally the mileage between repairs to the running gear and frame.

*Modern equipment* has made it possible to extend the mileage between repairs with a more intensive utilisation and in certain cases an increase in load and speed.

*New rolling stock* is ordered for various reasons: saving in working costs, higher speed, greater safety, more comfort. The saving in maintenance costs, whilst not the overriding factor, enters into these reasons.

After a discussion between Messrs. BOND (*British Railways*), CHAN and DE HAAS (*Netherlands Railways*), the first paragraph of *Summary No. 1* was adopted without modification.

With regard to paragraph 2 of this summary, Mr. PUGSON (*British Railways*) suggested that the quality of tyre steel might be mentioned as one of the principal factors in allowing increased mileages and after an exchange of views between Messrs. PUGSON, CHAN and CUTTICA (*Italian State Railways*) to decide

if this factor was worthy of separate mention in the Summaries, M. CHAN proposed that the designation « modern equipment » should be amplified by the following phrase, « that is the stock provided with the improvements mentioned in the report ».

Mr. PUGSON agreed with this proposal.

— *Summary No. 1* was adopted with this alteration.

#### *Summary No. 2 :*

2. *One piece wheels* have been tested by many Administrations. They avoid tyre movement and in the case of carriages, railcars and motor coaches, the wheels can be lightened.

The information on cost price of these and tyred wheels does not agree. It has to be remembered that the service conditions are different, and that the one piece wheel is not manufactured at present in Europe in large quantities. Heat treating of the tread is advised to get at least the mileage of tyred wheels or better, to exceed it. Increasing the resistance to wear and ultimately the possibility of repairing by welding are two benefits more readily obtained with one piece wheels than with tyred wheels, wherein the shrinkage stress alters the allowable working stress in the tyre. It appears desirable that the experience with one piece wheels be followed up.

Mr. PUGSON stated that rolled steel one-piece wheels are almost exclusively used for wagon stock in Britain.

M. CHAN then proposed to delete the last phrase of the second sentence in the second paragraph: « and to take note of the fact that the one-piece wheel is not manufactured at present in Europe in large quantities ».

— This proposal was adopted.

Mr. PUGSON asked that the text of the sentence in the second paragraph referring to the possibility of repair by welding of the rims of one-piece wheels or of tyres could be modified to take into account the fact that the British Railways had for many years adopted this type of repair for tyred wheels, although they had not yet used it on one-piece wheels.

After an exchange of views between Messrs. PUGSON, CHAN and BULLEID (*Coras Iompair Eireann*), the following text was proposed :

« Increasing the resistance to wear and ultimately the possibility of repairing the root of the flange by welding seem to be two benefits more readily obtained with one-piece wheels. »

— This text would be submitted for approval by the Section at the next meeting.

#### *Summary No. 3 :*

3. To increase the mileage between repairs and reduce wear with harder rails some railways use *tyres* of 90 kg/mm<sup>2</sup> (57.14 t. per sq. in.) quality.

*Lubrication of the flanges or the rails* is desirable to reduce the reciprocal wear of these two parts. Most Administrations carry the lubricator on the engine. Many and various arrangements are used.

— *Summary No. 3* was adopted without discussion.

#### *Summary No. 4 :*

4. *Independent wheels* have been tested by some Administrations (British Railways (L. M. R.), Italian State Railways and Swiss Federal Railways) but the wear was rapid and irregular. The use of such wheels at least under the conditions used in the trials is not to be recommended.

The question of trials with independent wheels gave rise to an interesting exchange of views between Messrs. BULLEID, PARMANTIER (*Société Nationale des Chemins de fer français*), CUTTICA, CHAN and READ (*New Zealand Government Railways*), regarding the desirability or otherwise of deprecating the use of such wheels. M. CHAN pointed out that it is guiding wheels which are the most subject to wear.

At the conclusion of this discussion the PRESIDENT proposed the inclusion of a sentence illustrating the necessity of carrying out more extensive trials than those which had so far been undertaken before being able to express a definite opinion on the possibility of using independent wheels.

M. CHAN suggested that for *Summary No. 4* the following text, taking account of the different suggestions made, might be adopted :

« Trials of independent wheels which have been carried out by several Administrations (L. M. R. of the British Railways, Italian Railways, Swiss Federal Railways) have often given rise to rapid and irregular wear of wheels of this type when used as guiding wheels. Definite conclusions regarding the advantage of independent wheels would require trials under other arrangements than those outlined in the report. »

— This text will be submitted for approval by the Section at the next meeting.

#### *Summary No. 5 :*

5. *Roller bearing boxes* tend to be increasingly used in view of the reduction in

hot boxes and the saving in maintenance. In the case of steam locomotives, the use of these boxes on the driving or coupled axles reduces wear, which results in an important increase in mileage between repairs.

The few incidents reported in connection with the journals can be ascribed to these journals being too small.

In view of the high price of roller bearing boxes, there are cases wherein other types of box can be preferred.

When *roller bearings are fitted to electric locomotives and motor coaches*, devices to prevent the electric current from passing through the roller bearings are fitted.

Following a statement by Mr. BOND, M. CHAN proposed the modification of the text of the second sentence of the first paragraph as follows :

« In the case of steam locomotives, the use of these boxes on the driving and coupled axles or on the driving axles only, provides a reduction in wear, resulting in an important increase in mileage between repairs. »

— This modification was adopted.

With regard to the last paragraph of this Summary, M. BAEYENS (*Société Nationale des Chemins de fer belges*) proposed the addition of the word « generally ».

— This amendment was also adopted.

— The text of *Summary No. 5* was amended according to these suggestions.

#### *Summary No. 6 :*

6. Amongst oil axle boxes other than of the classic type, should be noted the boxes with mechanical oil circulation, and on steam locomotives, boxes with two brasses completely surrounding the journal (British Rlys. (S.R.) and S.N.C.F.).

Lubricator pads of oil axle boxes are improved by increasing the number of wool wicks and the use of wool of special qualities.

The tendency in Europe is to use high tin *antifriction* metal for high speed locomotives and rolling stock. Rose metal or lead copper (Cu = 69, Pb = 30, Zn = 1) is widely used on the Italian State Railways on goods wagons.

These latter years, the tendency has been to use thin coatings of white metal not exceeding 3 mm (1/8") thick, but it is noted some Administrations are going back to a rather greater minimum of 5 to 7 mm (13/64" to 9/32").

— *Summary No. 6* was adopted without remark.

#### *Summary No. 7 :*

7. The upkeep of parts *subject to wear* is generally done by using detachable wearing plates. Valuable results have been reported in the case of oil axle box guide by using manganese steel (British Rlys) and by using plastic materials (Italian State Rlys. and Paris Metropolitan) or asbestos base material (Norwegian Rlys.).

To improve stability and comfort, and reduce tyre wear, it is desirable to *prevent hunting as far as possible*. One way to achieve this is to avoid longitudinal play in the direction of the track between boxes and frame. Very varied methods of doing this have been used, which either reduce the effects of rubbing or suppress it:

— adjustable or self-adjusting axle box wedges used especially on steam locomotives;

— guides incorporating india rubber fastened to the frame;

— axle box guides in the form of vertical cylindrical pedestals sliding in fitted cylinders (fig. 28, p. 1817/177, August, 1950, *Bulletin*);

— axle boxes connected to frame by rods and silent bloc bushes (fig. 25, p. 1814/174, August, 1950, *Bulletin*) a solution used on several railways;

— boxes and frame connected by laminated springs placed longitudinally (fig. 30, p. 1826/186 of the August, 1950, *Bulletin*) a variant of the preceding arrangement.

Mr. LYNES, *Reporter*, pointed out that no mention had been made in the report of the use of hardened steel bushes for articulated joints, particularly on brake rigging.

After consultation with M. CHAN, the following text was proposed for the second sentence of the first paragraph :

“ Interesting results have been reported :

“ 1° for articulated joints in general and in particular for brake rigging by the use of hardened steel bushes;

“ 2° for axle box guides by the provision of the following :

“ — use of 13/14 % manganese steel (*British Railways*);

“ — use of plastic materials (*Italian State Railways* and *Metro. of Paris*);

“ — use of asbestos base material (*Norwegian Railways*). »

— This text will be submitted for approval by the Section at the next meeting.

#### *Summary No. 8 :*

8. *Buckling springs* is generally done hot. There is some extension in Great Britain, and Switzerland, and tests in France of the practice of fitting the buckles on cold.

*Spring steel* should be obtained under such conditions that the same heat treatment in the shops will produce constant results. This can be got either by specifying the chemical composition or by specifying given characteristics to be obtained by a predetermined heat treatment.

*Coiled springs* should have their surface free from defects. Some Administrations (C. F. F., Norwegian Rlys.) report fewer breakages with springs of square and rectangular section, than with round section bars.

— Adopted without alteration.

#### *Summary No. 9 :*

9. *Rubber*, widely used on buffing and drawgear is now being applied to the spring gear and connecting members between the body and frame of tenders, electric locomotives, motor coaches, railcars, and carriages.

M. LOQUET (*Société Nationale des Chemins de fer belges*) reported that poor results had been obtained on the Belgian Railways with rubber in buffing and drawgear. This was partly due to the severe service which the stock was required to operate.

The remaining Delegates were unanimous in reporting that good results were obtained by the use of rubber in these parts, M. LOQUET did not therefore ask that the Summary should be amended.

M. CHAN nevertheless proposed to delete from the French text the word “ très ” but the word “ widely ” in the English text was maintained at the request of Mr. PUGSON.

— This modification was adopted.

Before the close of the meeting M. DE HAAS called the attention of the Delegates to the question of shelling and scaling of tyres and asked whether other Administrations had experienced the same difficulties as the Netherlands Railways, in which case it might be mentioned in *Summary No. 3*.

The PRESIDENT ruled that as *Summary No. 3* had been adopted without dissent, it was unnecessary to re-open the discussion and the remark which M. DE HAAS had passed would be noted in the Report of the Proceedings.

— The Summaries which had not been adopted would be re-submitted at the next meeting.

### Meeting of the 28th. September 1950.

The Section considered the modifications to *Summaries Nos. 2, 4 and 7* suggested at the last meeting.

#### *Summary No. 2 :*

The PRESIDENT submitted for discussion the proposed amendment to the text of *Summary No. 2* (second paragraph) reproduced in the report of the meeting of the 27th September.

— This amendment was accepted and *Summary No. 2* was adopted.

#### *Summary No. 4 :*

The PRESIDENT submitted for discussion the revised text proposed by M. CHAN, *Special Reporter*, for *Summary No. 4* reproduced in the report of the meeting of the 27th September, 1950.

— The new text of *Summary No. 4* was adopted.

#### *Summary No. 7 :*

The PRESIDENT submitted for discussion the revised text reproduced in the report of the meeting of the 27th September, 1950, intended to replace the second sentence of the first paragraph.

M. CHAN considered it desirable to amplify point No. 1 of the revised text by the inclusion of the words: « ...or case-hardened ».

— *Summary No. 7* was adopted with this amendment.

The PRESIDENT thanked the Delegates, the Reporters, M. CHAN, *Special Repor-*

*ter*, and M. VELLEMAN, the *Interpreter*, for their efficient participation in these difficult technical debates, which, thanks to the efforts of all concerned, had speedily provided concise and clear summaries.

— The full text of the Summaries adopted is given hereafter:

### SUMMARIES.

« 1. *Tyre wear* determines generally the mileage between repairs to the running gear and frame.

« *Modern equipment*, that is, the stock provided with the improvements mentioned in the Report, has made it possible to extend the mileage between repairs with a more intensive utilisation and in certain cases an increase in load and speed.

« *New rolling stock* is ordered for various reasons: saving in working costs, higher speed, greater safety, more comfort. The saving in maintenance costs, whilst not the overriding factor, enters into these reasons.

« 2. *One piece wheels* have been tested by many Administrations. They avoid tyre movement and in the case of carriages, railcars and motor coaches, the wheels can be lightened.

« The information on cost price of these and tyred wheels does not agree. It has to be remembered that the service conditions are different.

« Heat treating of the tread is advised to get at least the mileage of tyred wheels or better, to exceed it. Increasing the resistance to wear and ultimately the possibility of repairing the root

“ of the flange by welding seem to be two benefits more readily obtained with one piece wheels. It appears desirable that the experience with one piece wheels be followed up.

“ 3. To increase the mileage between repairs and reduce wear with harder rails some railways use *tyres* of 90 kg/mm<sup>2</sup> (57.14 tons per sq. in.) quality.

“ *Lubrication of the flanges or the rails* is desirable to reduce the reciprocal wear of these two parts. Most Administrations carry the lubricator on the engine. Many and various arrangements are used.

“ 4. Trials of independent wheels which have been carried out by several Administrations (L. M. R. of the British Railways, Italian Railways, Swiss Federal Railways) have often given rise to rapid and irregular wear of wheels of this type when used as guiding wheels. Definite conclusions regarding the advantage of independent wheels would require trials under other arrangements than those outlined in the Report.

“ 5. *Roller bearing boxes* tend to be increasingly used in view of the reduction in hot boxes and the saving in maintenance. In the case of steam locomotives, the use of these boxes on the driving and coupled axles or on the driving axles only provides a reduction in wear, resulting in an important increase in mileage between repairs.

“ The few incidents reported in connection with the journals can be

“ ascribed to these journals being too small.

“ In view of the high price of roller bearing boxes, there are cases wherein other types of box can be preferred.

“ *When roller bearings are fitted to electric locomotives and motor coaches*, devices to prevent the electric current from passing through the roller bearings are generally fitted.

“ 6. Amongst oil axle boxes other than of the classic type, should be noted the boxes with mechanical oil circulation, and on steam locomotives, boxes with two brasses completely surrounding the journal (British Rlys. (S. R.) and S.N.C.F.).

“ Lubricator pads of oil axle boxes are improved by increasing the number of wool wicks and the use of wool of special qualities.

“ The tendency in Europe is to use high tin *antifriction* metal for high speed locomotives and rolling stock. Rose metal or lead copper (Cu = 69, Pb = 30, Zn = 1) is widely used on the Italian State Railways on goods wagons.

“ These latter years, the tendency has been to use thin coatings of white metal not exceeding 3 mm (1/8") thick, but it is noted some Administrations are going back to a rather greater minimum of 5 to 7 mm (13/64" to 9/32").

“ 7. The upkeep of parts *subject to wear* is generally done by using detachable wearing plates.

“ Interesting results have been reported:

“ 1°) for articulated joints in general  
“ and in particular for brake rigging by  
“ the use of hardened or case-hardened  
“ steel bushes;

“ 2°) for axle box guides by the pro-  
“ vision of the following :

“ use of 13/14 % manganese steel  
“ (*British Rlys.*);

“ use of plastic materials (*Italian State  
Rlys. and Metro. of Paris*);

“ use of asbestos base material (*Nor-  
wegian Rlys.*).

“ To improve stability and comfort,  
“ and reduce tyre wear, it is desirable  
“ to prevent hunting as far as possible.  
“ One way to achieve this is to avoid  
“ longitudinal play in the direction of  
“ the track between boxes and frame.  
“ Very varied methods of doing this  
“ have been used, which either reduce  
“ the effects of rubbing or suppress it :

“ adjustable or self-adjusting axle box  
“ wedges used especially on steam loco-  
“ motives;

“ guides incorporating india rubber  
“ fastened to the frame;

“ axle box guides in the form of ver-  
“ tical cylindrical pedestals sliding in  
“ fitted cylinders (fig. 28, p. 1817/177,  
“ August, 1950, *Bulletin*);

“ axle boxes connected to frame by  
“ rods and silent bloc bushes (fig. 25,  
“ p. 1814/174, August, 1950, *Bulletin*)  
“ a solution used on several Railways;  
“ boxes and frame connected by  
“ laminated springs placed longitudinally  
“ (fig. 30, p. 1826/186, of the August,  
“ 1950, *Bulletin*) a variant of the pre-  
“ ceding arrangement.

“ 8. *Buckling springs* is generally

“ done hot. There is some extension in  
“ Great Britain, and Switzerland, and  
“ tests in France of the practice of  
“ fitting the buckles on cold.

“ *Spring steel* should be obtained  
“ under such conditions that the same  
“ heat treatment in the shops will pro-  
“ duce constant results. This can be  
“ got either by specifying the chemical  
“ composition or by specifying given  
“ characteristics to be obtained by a  
“ predetermined heat treatment.

“ *Coiled springs* should have their  
“ surface free from defects. Some  
“ Administrations (C. F. F., Norwegian  
“ Railways) report fewer breakages with  
“ springs of square and rectangular sec-  
“ tion, than with round section bars.

“ 9. *Rubber*, widely used on buffing  
“ and drawgear is now being applied to  
“ the spring gear and connecting mem-  
“ bers between the body and frame of  
“ tenders, electric locomotives, motor  
“ coaches, railcars, and carriages.

— The Plenary Meeting held on Sep-  
tember 29th, 1950, ratified these sum-  
maries.

## QUESTION VI.

**Comparative study of the different types  
of transmission between motors and  
axles of electric locomotives, electric  
motor coaches and Diesel-electric rail-  
cars.**

**Effect on the track of the types of bogies  
and systems of motor suspension.**

### Preliminary documents.

Report (America (North and South),  
Burma, China, Egypt, Great Britain and  
North Ireland, Dominions, Protectorates  
and Colonies, India, Iran, Iraq, Malay

States and Pakistan), by W. S. GRAFF-BAKER. (See *Bulletin*, April 1950, p. 543, and June 1950, p. 1145, or separate issue No. 13.)

Report (Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Turkey and Yugoslavia), by J. TAPIA. (See *Bulletin*, July 1950, p. 1529, or separate issue No. 32.)

Report (Austria, Belgium and Colony, Denmark, France and Colonies, Luxembourg, Netherlands and Colonies, Norway, Poland, Sweden, Switzerland and Syria), by Ch. HOFFET. (See *Bulletin*, August 1950, p. 1633, or separate issue No. 34.)

*Special Reporter* : Ch. HOFFET. (See *Bulletin*, October 1950, p. 2069.)

### Report of Section II.

(See *Daily Journal of the Session*, No. 6, p. 6 to 8; No. 7, p. 2; No. 8, p. 1.)

### Meeting held on October 2nd. 1950.

The PRESIDENT called upon M. HOFFET, *Special Reporter*, who, after describing the method by which the summaries had been compiled, despite the fact that there were wide differences of opinion on the question, read *Summary No. 1*.

#### *Summary No. 1 :*

1. The construction of railway rolling stock in general and of motored vehicles in particular is limited by :

- a) the loading gauge;
- b) the permissible axle load;
- c) the materials available;

- d) the cost of construction;
- e) the cost of maintenance, inspection and repair.

M. PARMANTIER (*Société Nationale des Chemins de fer français*) considered *Summary No. 1* should be deleted in view of its too general nature and the fact that it applied to all types of stock.

M. d'ARBELA (*Italian State Railways*) and M. BAUYENS (*Société Nationale des Chemins de fer belges*) supported M. PARMANTIER's suggestion and stated that in any case, if the conclusion was to be maintained, it should be amplified by factors other than those mentioned, in particular tractive effort and maximum speed.

M. HUG (*Bernese Alps Railways*) and the SPECIAL REPORTER suggested the advantage of retaining the general conditions contained in *Summary No. 1* by incorporating them in an *introduction* to the actual summaries, and this suggestion was adopted by the majority of the Delegates present.

— The Section adopted the following text :

#### **Introduction.**

« The construction of railway rolling stock in general and of motor vehicles in particular is limited by :

- « a) the loading gauge;
- « b) the permissible axle load;
- « c) the materials available;
- « d) the cost of construction;
- « e) the cost of maintenance, inspection and repair;
- « f) the maximum speed;
- « g) the tractive effort. »

*Summary No. 2 :*

2. There are a number of different transmission systems which can be used for all speeds up to 150 km/h. and for horse powers up to 1 500 per motored axle. The choice of these will be dictated by local conditions:

a) if the track is sufficiently robust and well maintained, nose suspension may be used without great disadvantage;

b) if the track is weaker, it is desirable to use one of the systems employing resilient transmission and frame mounted motors if possible.

It should be noted that nose suspension inevitably causes lateral shocks to the track by reason of the unsprung weight of the motor. The progressive wear of rail and flange only aggravates the trouble.

Summary No. 2 of the report consequently became *Summary No. 1*.

The PRESIDENT pointed out that there was a difference between the French and the English texts in paragraph a): the French text stated that nose suspension could be utilised « sans inconvénients » whilst the English text read « without great disadvantage ».

After long exchange of views between Messrs. PARMANTIER, LEDUC (*representing the Permanent Way Dept. of the S. N. C. F. in place of M. R. Lévi*), d'ARBELA and HOFFET, during which the delegates stated that there are always some drawbacks, it was decided to retain the word « great » in the English text and to insert the word « grands » in the French text, which thus becomes « sans grands inconvénients ».

— During this discussion M. LEDUC read a note by M. Lévi which pointed out that it is not lateral effort on the track which is the main complaint against nose suspension of motors but

rather the high frequency vertical efforts which can produce a high rate of rail breakages.

M. d'ARBELA stated that the maximum speed of 150 km per hour shown for locomotives and electric motor coaches was not correct, as certain types of stock ran at 160 km per hour and more without disadvantage and M. HOFFET proposed that the words « up to 150 km per hour » should be replaced by « to about 150 km per hour ». This proposal was adopted.

M. PARMANTIER finally proposed that, to make the text clearer, it should be set out in three paragraphs as follows:

first paragraph comprising the first sentence of the summary;

second paragraph comprising the last paragraph of the present summary to which should be added a remark showing the advantage of continuing scientific trials to investigate the degree of shock exerted;

third paragraph designed to set out the conditions for the choice of transmission comprising the text of paragraphs a) and b) of the summary.

The Section was in agreement with this proposal and the following text will be submitted for approval by the Delegates at the next meeting:

*New summary No. 1 :*

« There are a number of different transmission systems which can be used for all speeds up to about 150 km per hour and for horse-powers up to 1 500 per motored axle.

« Nose suspension inevitably causes vertical and lateral shocks to the track by reason of the unsprung weight of the motor. The progressive wear on rail and flange only aggravates the trouble. It is desirable to undertake trials for measuring the efforts exerted on the track by different systems of suspension.

« Choice between the different systems of transmissions will be dictated by local conditions :

« a) if the track is sufficiently robust and well maintained, nose suspension may be used without great disadvantage;

« b) if the track is weaker, it is desirable to use one of the systems employing resilient transmission and frame-mounted motors if possible. »

Mr. DE SOUZA (*Railway Board, India*) reported that in India undulating wear of rails caused by the running of motor coaches on strong and well maintained track had been completely eliminated following extended trials by reducing to a minimum all play on the bogie bolsters and axle boxes. This point was worthy of attention.

The PRESIDENT considered that the question of play could be discussed in the *Summary No. 2*.

M. LEDUC asked if, at the end of paragraph a) of the *new Summary No. 1*, the Delegates would have any objection to the addition after « disadvantage » of the words « at low and moderate powers » so as to mention the power factor as well as the various permanent way factors entering into the choice of transmission.

The PRESIDENT considered that such an addition coming at the end of a long and difficult discussion might bring the whole question under re-consideration.

✓ M. LEDUC then withdrew his proposal but asked that his request should be noted in the records of the meeting.

*Summary No. 3 (New Summary No. 2) :*

3. In order to avoid severe vertical shocks to the track due to high speeds it is necessary to fit a resilient suspension system between the bogie and the body of locomotives by the use of arrangements similar to those long used on coaching stock and railcars. On locomotives, transverse linkages between bogies are tending to become general :

a) in order to reduce side wear on the track and flange wear, especially on curves;

b) in order to reduce hunting on straight track.

M. CHAN (*Société Nationale des Chemins de fer français*) asked if this referred to lateral or vertical shocks and M. GRAFF-BAKER, *Reporter*, considered that it was necessary to mention both types of shock.

M. HOFFET thought that as both types of shock were involved it was preferable to keep the text short and embrace them under the general designation of shock without being more precise.

M. CHAN asked which arrangements similar to those of coaching stock and motor coaches were included in the remark in the summary. M. HOFFET stated that this concerned particularly swing bolsters since the construction of electric locomotive bogies is developing along parallel lines to that of carriage and motor coach bogies.

M. CHAN then proposed that the similarity to steam locomotive bogies should also be mentioned.

After discussion it was decided that the words « coaching stock and railcars » should be replaced by the words « other vehicles ».

With regard to the second sentence of the summary, M. BAEYENS stated that the present use of transverse links between bogies did not appear to show a tendency to become general.

M. HOFFET considered that this was not the conclusion which could be drawn from the reports.

M. PARMANTIER stated that in France this tendency is not becoming general on high speed locomotives and proposed the addition of the words « in various countries ». This was accepted.

The PRESIDENT asked M. HOFFET to approach the interested delegates to agree on a new text to be submitted for the approval of the Section at the next meeting. The text is as follows :

« In order to avoid severe shocks to the track due to higher speeds, there is a tendency to use on electric locomotives devices allowing transverse movement either between the body and the bogie, similar to those already used on other types of stock, or even between the axle and the bogie.

« On locomotives connecting devices between bogies are tending to become general in certain countries :

« a) in order to reduce side wear on the track and flange wear, especially on curves;

« b) in order to reduce hunting on straight track. »

#### *Summary No. 4 (New Summary No. 3) :*

4. The operating conditions with steam and electric traction differ too much from one another to permit a reasonable comparison of track maintenance costs to be made.

Summary No. 4 of the Special Report, which now becomes *Summary No. 3* was approved without discussion.

#### **Meeting of the 3rd. October 1950.**

The PRESIDENT stated that the Delegates were required to consider the new texts proposed for *Summaries No. 1 and 2*.

#### *Summary No. 1 :*

— The new text was read.

M. PARMANTIER whilst in complete agreement with the text, suggested, for reasons of clarity, a slight modification in the method of indexing the paragraphs, which was adopted.

« a) There are a number of different transmission systems which can be used for all speeds up to about 150 km per hour and for horse-powers up to 1 500 per motored axle.

b) Nose suspension inevitably causes vertical and lateral shocks to the track by reason of the unsprung weight of the motor. The progressive wear on rail and flange only aggravates the trouble. It is desirable to undertake trials for measuring the efforts exerted on the track by different systems of suspension.

« c) Choice between the different

systems of transmissions will be dictated by local conditions :

“ if the track is sufficiently robust and well maintained, nose suspension may be used without great disadvantage;

“ if the track is weaker, it is desirable to use one of the systems employing resilient transmission and frame-mounted motors if possible. »

M. BAEYENS pointed out that there was a difference between the French and English texts at the end of the seventh line of the second paragraph. The French text included the words “ suspension of the motors », whilst the English text simply stated “ suspension ». The English text was accordingly amended.

— *Summary No. 1* was then adopted subject to these modifications.

#### *Summary No. 2 :*

— The proposed new text for *Summary No. 2* was read.

— *Summary No. 2* was adopted without discussion.

The Agenda thus having been completed, the PRESIDENT thanked the Delegates, the Reporters and, in particular, M. HOFFET, *Special Reporter*, for their contributions to the work of Section II; he regretted that he had to ask several delegates to confer on the questions outside the meeting times, but was sure that their efforts had allowed a more rapid agreement on satisfactory summaries.

— The full text of the Summaries adopted is as follows :

## SUMMARIES.

### *Introduction.*

“ The construction of railway rolling stock in general and of motor-vehicles in particular is limited by:—  
 “ a) the loading gauge;  
 “ b) the permissible axle load;  
 “ c) the materials available;  
 “ d) the cost of construction;  
 “ e) the cost of maintenance, inspection and repair;  
 “ f) the maximum speed;  
 “ g) the tractive effort.

“ 1. a) There are a number of different transmission systems which can be used for all speeds up to about 150 km. per hour and for horsepower up to 1 500 per motored axle.

“ b) Nose suspension inevitably causes vertical and lateral shocks to the track by reason of the unsprung weight of the motor. The progressive wear on rail and flange only aggravates the trouble. It is desirable to undertake trials for measuring the efforts exerted on the track by different systems of suspension of the motors.

“ c) Choice between the different systems of transmissions will be dictated by local conditions :

“ if the track is sufficiently robust and well maintained, nose suspension may be used without great disadvantage;  
 “ if the track is weaker, it is desirable to use one of the systems employing resilient transmission and frame mounted motors if possible.

“ 2. In order to avoid severe shocks to the track due to higher speeds, there

“ is a tendency to use on electric locomotives devices allowing transverse movement either between the body and the bogie, similar to those already used on other types of stock, or even between the axle and the bogie.

“ On locomotives connecting devices between bogies are tending to become general in certain countries :

“ a) in order to reduce side wear on the track and flange wear, especially on curves;

“ b) in order to reduce hunting on straight track.

“ 3. The operating conditions with steam and electric traction differ too much from one another to permit a reasonable comparison of track maintenance costs to be made.

— These Summaries were ratified by the Plenary Meeting of the 4th October 1950.

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## **SECTION III. — Working.**

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*President : Dr.-Ing. G. PALMIERI.*

*Vice-Presidents : Dr. E. SEIDLER, H. VAN GALEN LAST, R. DA COSTA COUVREUR  
and Ranald J. HARVEY.*

*Principal Secretary : E. VOORDECKER.*

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### **QUESTION VII.**

**Organizing methods to be used in large marshalling yards and terminals, to reduce to the minimum the cost per wagon shunted.**

**Determination of the staff and number of shunting engines needed.**

**Capacity and control of the efficiency of the marshalling yards.**

**Recording and numbertaking arrangements in the arrival and departure yards.**

**Statistics and traffic analysis by the control-room.**

**Braking and retarding arrangements.**

**The formation of trains for departure.**

#### **Preliminary documents.**

**Report (Great Britain and Northern Ireland, Dominions, Protectorates and Colonies, North and South America, China, Burma, Egypt, India, Pakistan, Malay States, Iran and Iraq), by E. W. ROSTERN.** (See *Bulletin*, April 1950, p. 409 or separate issue No. 9).

**Report (Belgium and Colony, Luxembourg, Norway, Denmark, Holland and Colonies, Switzerland, France and Colonies, Poland and Syria), by A. LAMARQUE.** (See *Bulletin*, June 1950, p. 1093, or separate issue No. 23).

**Report (Italy, Spain, Portugal and Colonies, Rumania, Bulgaria, Sweden, Turkey, Greece, Czechoslovakia, Yugoslavia, Finland, Hungary and Austria), by**

**M. CIRILLO.** (See *Bulletin*, June 1950, p. 1227, or separate issue No. 25).

*Special Reporter: M. CIRILLO.* (See *Bulletin*, October 1950, p. 2079.)

#### **Report of Section III.**

(See *Daily Journal of the Session*, No. 2, p. 11 to 15; No. 3, pp. 8 and 9; No. 5, p. 2.)

#### **Meeting held on September 26th 1950.**

The President, Dr. Ing. G. C. PALMIERI declared the Meeting open at 9.30 a. m.

The PRESIDENT called upon M. CIRILLO, *Special Reporter*, to summarise his report.

M. CIRILLO summed up the various points which had guided the reporters in their study, which aimed at finding the most appropriate methods and organisation to ensure the economical working of large marshalling yards, and also taking into consideration factors relating to small or less up-to-date yards.

From answers received it can be gathered that, generally, the same procedure and methods are adopted as far as the work and principal operations are concerned.

However, there appears to be an im-

portant divergence of opinion as far as certain points are concerned and to which M. CIRILLO wished to draw special attention :

the setting up of a « control post »; the advantage obtained by cutting out the checking of wagons on arrival and departure in order to reduce staff;

the making up of trains conveying traffic for more than one destination;

putting into force of a bonus system for the yard staff;

importance of measures to be adopted in the case of the falling off in traffic;

selection and training of marshalling yard staff.

— Since no questions were put forward the PRESIDENT proposed to examine the various conclusions, beginning with the *Chapter I*:

### I. General output of the yard.

*Summary No. 1 :*

#### 1. Labelling wagons.

The use by the consigning station of coded indications on the labels of wagons showing the destination station and legible at a distance facilitates, in countries of any size, the work of the yard employees and reduces the risk of wagons going astray.

M. MOULART (*Société Nationale des Chemins de fer belges*) pointed out that the use of such labels was of even greater importance in the case of railways in dense areas where there are many alternative routes. He suggested the addition of the words « railways in a dense area where there are many alternative routes » after « ... comparatively large countries ».

After discussion it was agreed to replace the sentence « comparatively large countries » by « railway undertakings of some importance with numerous lines ».

— *Summary No. 1* amended as indicated, was adopted.

*Summary No. 2 :*

#### 2. Notification.

Preliminary notification of certain details of the composition of incoming trains enables the yard better to estimate and organise its work.

— Adopted without any alteration.

*Summary No. 3 :*

#### 3. Timetables.

Though the timetables must be fixed first of all in such a way as to ensure the best forwarding of the wagons and most satisfactory services, they must also to the greatest possible extent take into account the highest efficiency of the yard, especially when there are insufficient reception or departure sidings.

M. VANDERBORGH (Société Nationale des Chemins de fer belges) suggested that the following sentence should be added to the conclusion : « These must also comply with the legitimate requirements of the public. »

M. CIRILLO was of the opinion that this point was not necessary since timetables are compiled « to ensure that the best forwarding arrangements for the wagons » and also in such a way as to give the customer the best possible delivery.

M. VANDERBORGH did not press his point and summary No. 3 was adopted with the following wording :

### 3. Timetables.

« Though the timetables must be fixed first of all in such a way as to ensure the best forwarding arrangement for the wagons and most satisfactory services, they must also as far as possible take into consideration the maximum output of the yard, especially when there are insufficient reception or departure sidings. »

### *Summary No. 4 :*

#### 4. Allocation of sidings.

Careful allocation of the marshalling sidings, based upon the installations of the yard and the kinds of trains to be made up with the wagons shunted onto the same siding, has a very good result upon the output of the yard.

M. VANDERBORGHt is of the opinion that the words « shunted on to the same siding » are superfluous because a difference must be drawn, in marshalling yards, between formation and sorting sidings. On formation sidings trains must be made up with shunted wagons.

M. LAMARQUE, *Reporter*, maintains, on the other hand, that this point is necessary as, for example, empty wagons run less easily and should be shunted, in preference, on to the sidings in the centre of the yard.

M. VANDERBORGHt sought to support his argument by the fact that on the formation sidings it was possible to undertake simultaneously the making up of several trains.

*Summary No. 4* was finally adopted as follows :

#### 4. Allocation of sidings.

Careful allocation of the marshalling

sidings, based upon the layout of the yard and the kinds of train to be made up with the wagons shunted, has produced good results on the turn-over of the yard. »

### *Summary No. 5 :*

#### 5. Co-ordination (and control) of the operations of the yard.

##### *Adaptation of resources to requirements.*

Co-ordination of the different operations carried out in the yard is essential for good output.

This is assured in the first place by the preparation of preliminary working programmes or harmonograms showing the way the different engines and gangs of the various parts of the yard are to be used in each shift. These programmes, which differ from day to day according to the traffic, should regulate in particular the way the different preliminary operations before shunting are carried out simultaneously.

In addition, the concentration of all useful data in the hands of a single official with extensive telephonic communications throughout the yard makes it possible to harmonise and control all the work and adapt requirements to resources from day to day to the fullest possible extent.

To carry out these indispensable duties, the setting up of a control post which can follow the movements of the trains and engines very closely as well as the way the different operations are proceeding, is an excellent expedient in large marshalling yards, especially when these consist of several scattered parts.

Mr. BARRINGTON-WARD (*British Railways*) criticised the word « control » which figures in the heading of *Summary No. 5*. He preferred the word « planning » which, in his mind, better portrayed the advanced organisation of the work.

M. CIRILLO and M. LAMARQUE are of the opinion that one of the functions of the control staff is to control the work and that in any case the conclusion men-

tions the advanced planning of work which covered the point which Mr. BARRINGTON-WARD had in mind.

M. LAMALLE (*Permanent Commission of the Association*) criticised the word « simultaneously » and preferred to see in the text that the preliminary operations are not only carried out at the same time but also within the same period.

M. MOULART wanted to simplify the text of the conclusion and M. VANDERBORGHT wished to stress the question of « control posts » which is mentioned in the last sentence, by replacing the words « appear desirable » with « is necessary ».

After a discussion in which MM. CIRILLO, ROSTERN, LAMARQUE and MARIN (*Italian State Railways*) took part, the text put forward by M. MOULART was adopted since M. CIRILLO pointed out that the opinion of the various Administrations consulted on the question of establishing « control posts » was not unanimous and therefore the recommendation contained in the conclusion could not be final.

M. PALMIERI read the text which had been redrafted as hereafter and which was adopted :

*5. Co-ordination and control of the operations of the yard. Use of equipment according to requirements.*

« Co-ordination of the different operations carried out in the yard is essential for good output.

« This is assured in the first place by the preparation of preliminary working programmes or harmonograms showing the way the different engines and gangs

of the various parts of the yard are to be used in each shift.

« These programmes will particularly provide for the carrying out of certain preliminary operations to be done at the same time and which are required for shunting.

« At the same time, the concentration of all useful data in the hands of the yardmaster with the necessary extensive telephonic communications throughout the yard makes it possible to carry out the programme to the best possible extent.

« In order to carry out these measures, a « control post » appears to be very desirable in large marshalling yards, especially if these have several independent yards. »

The PRESIDENT began then the examination of the next item :

*Shunting engines.*

*Summary No. 6 :*

6. The shunting engines used in marshalling yards must be of a suitable type for the special work required of them. In non-electrified yards, the Diesel engine has proved its worth wherever it has been used, from the point of view of having a higher output and greater flexibility than the steam locomotive.

Mr. BARRINGTON-WARD pointed out that Diesel engines were cheaper than steam engines.

M. MARIN was of the opinion that the second part of the conclusion also applies in the case of electrified yards and that the beginning of the sentence « in non-electrified yards » should be deleted.

M. CIRILLO did not agree with this point

as in electrified yards the shunting is carried out by electric locomotives.

M. MARIN, on the contrary, stated that in his opinion Diesel engines are cheaper in every case.

M. GOURSAT (*Société Nationale des Chemins de fer français*) drew attention to the fact that the Reporters had not compared three types of engines, steam, Diesel or electric, and had confined themselves to only report on steam and Diesel engines as shunting power. Therefore nothing could be lost by omitting the words «in non-electrified yards».

— This omission was accepted and Conclusion No. 6 was adopted without any further modification.

#### *Summary No. 7 :*

7. In the case of steam locomotives, it is necessary to take special steps to minimise interruptions due to the need to refuel or for maintenance purposes. It is often of value to install a fuelling post in the yard where water and coal can be taken on.

M. LAMARQUE wished the word «often» to be replaced by «in almost every case» to strengthen the point at issue.

— This alteration was agreed upon and Summary No. 7 was adopted without any other modification.

#### *Summary No. 8 :*

8. The use of train locomotives for shunting is not to be recommended, except in the case of certain special operations of limited magnitude.

M. VANDERBORGH suggested that this summary should be deleted as it was mentioned in Summary No. 6 that shunt-

ing engines should be appropriate for the work to be carried out in marshalling yards, and this does not apply to train engines.

M. CIRILLO went on to say that train engines had been mentioned not for purpose of comparing them with shunting engines but because, in certain unfrequent cases, it is necessary to use them, and this practice is sometimes economical.

Mr. BARRINGTON-WARD, on the other hand, believes that the use of train engines should be *forbidden* except under special circumstances. It is in the interest of the normal working of trains that these engines should be sent back to their Depot without delay.

M. DELACARTE (*Société Nationale des Chemins de fer français*) did not agree with the point raised by Mr. BARRINGTON-WARD, because there exists on the S. N. C. F. certain Diesel engines which can perform both the duties of a shunting and train engine.

A lengthy discussion between MM. CIRILLO, LAMARQUE, VANDERBORGH, PALMIERI and BARRINGTON-WARD ensued in order to find out whether Summary No. 8 was to be deleted or whether a paragraph should be added to Summary No. 6.

Several proposals in this connection were made, including some by Mr. PICKFORD (*British Railways*) and by M. MARIN.

M. TRIBELHORN (*Swiss Federal Railways*) asked on the contrary, that this conclusion should be left as it stood for the reasons already put forward by M. DELACARTE.

Mr. PARKHOUSE (*British Railways*) underlined once more the point of view of the British Railways which is that train engines should not be held up in marshalling yards for purposes other than those for which they are essentially required, and which necessitates their immediate return to the Depot.

Finally, the question was put to the vote by the PRESIDENT and the majority of the Delegates were in favour of retaining *Summary No. 8* provided that « In principle » was inserted at the beginning of the sentence.

— *Summary No. 8*, with this alteration, was adopted.

#### *Summary No. 9 :*

9. The proper utilisation of the shunting engines, which is shown by the number of wagons shunted per hour, can lead to considerable economies; it must be followed from day to day by the management of the yard and by the control post, dealt with under point 5, if there is one.

— This conclusion was adopted but the last words « if there is one » are to be deleted following the proposal put forward by M. VANDERBORGH.

— *Chapter II* is then examined :

#### **II. Efficiency of the special operations carried out in the yard.**

##### *Summary No. 10 :*

###### *10. Marking off.*

Most of the Administrations consulted consider that the marking off on arrival and departure is of special importance as regards the proper working of the yard, and care should be taken to see that this work is properly done. It appears advisable, whenever it is possible, to let the markers off

prepare the shunting lists. Finally a certain amount of regulation of the work of the markers off may be useful in certain very large yards.

M. VANDERBORGH was of the opinion that this conclusion was lengthy and should be abridged, and M. LAMARQUE agreed to this proposal provided that a small alteration was made. The text of the adopted conclusion reads as follows :

###### *10. Numbertaking.*

« Careful checking of wagons on arrival and departure provide great advantages.

« It is also recommended that the numbertakers should prepare cut cards and shunting lists.

« Finally, certain regulations regarding the numbertaking should be of great use in large yards. »

###### *Summary No. 11 :*

###### *11. Inspection and repairs.*

In general it is as well to make a complete inspection of the wagons on the actual reception sidings so that damaged wagons can be sent direct to a special siding when they are shunted; the second inspection, which takes place before departure, will then rarely discover any wagons needing to be taken out.

In the large marshalling yards, certain marshalling sidings (the outer ones as a general rule) can be usefully allocated for very small repairs, so long as the essential safety precautions are taken.

A discussion took place between MM. BARRINGTON-WARD, WATKINS, CIRILLO, PALMIERI, ROSTERN and LAMARQUE regarding the purpose of the second check in the yard. The Delegates finally agreed that this serves to detect any damage which wagons may have suffered during shunting operations.

M. LAMARQUE then suggested that the sentence under discussion should be modified to read «the second check before departure is only to detect wagons which may have been damaged while in marshalling yards.

— This proposal was agreed and the *Summary No. 11, duly amended, was adopted.*

Then the *Summaries No. 12, 13 and 14 relating to Shunting* were read out :

#### *Summary No. 12 :*

12. The speed of shunting depends upon the layout and the facilities provided, the prevailing weather conditions (and in some cases the composition of the train to be shunted). These points being taken into account, the speed selected should be the maximum speed which allows the wagons to run into the marshalling sidings with the greatest regularity and the minimum of wrong shunts and overtakings.

— Adopted.

#### *Summary No. 13 :*

13. The driver, the man in charge of the hump, the pointsmen and all the shunting staff should be in close communication with each other by visual and oral means, and also by telecommunications.

— Adopted.

#### *Summary No. 14 :*

14. The prevention of lost time and accidents is of the greatest importance from the point of view of the general output of the yard. In particular, care must be taken to reduce to the minimum any interruptions to the shunting, specially, by taking steps to deal with the refuelling of the engines on the site, the closing up of wagons in the sidings and the reduction in the numbers of wrong shunts.

— Adopted.

#### *Summary No. 15 :*

*Summary. No. 15 relating to Braking and skid braking* was then read out :

##### *15. Braking and skid braking.*

Overtaking, rough shunts and damage must be reduced to the absolute minimum by suitable braking and skid braking methods.

In yards equipped with retarders the best solution is generally :

- on the one hand, to reduce the speed of the wagons by means of retarders;
- on the other hand, to stop them by means of hand operated skids in the siding, immediately behind and as near as possible to the last wagon shunted.

In yards not equipped with retarders the spacing of the wagons is generally carried out by special apparatus or hand operated skids, which are thrown clear of the rails; the wagons are stopped at the end of the siding by hand operated skids as in the previous case.

M. MOULART suggested that a sentence underlining the importance of retarders should be added as such equipment increases the speed at which wagons can be shunted by approximately 50 %.

M. LAMARQUE pointed out that this was one of the points which was to be discussed by Section No. I which dealt with installations and that Section III was only concerned with the best possible methods to be adopted in certain installations. A long discussion followed on this point.

M. CIRILLO was quite willing to accept this suggestion but without giving any percentage regarding the increase in the speed of wagons shunted as this question had not been put forward to the various Administrations.

M. MARCHAND (*Société Nationale des*

*Chemins de fer français*) went on to say that if this question was considered, then it was essential to mention the other factors, such as, automatic control of points, etc., which together with retarders contribute to a greater speed in the shunting of wagons.

M. PALMIERI pointed out that the shunting speed had already been covered in *Summary No. 12* and M. MARCHAND suggested that this summary should be ended by the following sentence :

« The use of retarders, together with the mechanisation of points, gives greater shunting speed. »

M. GOURSAT pointed out that Question VII was particularly concerned with the reduction in cost per wagon shunted, and it was therefore logical to stress the interest of installations increasing the output of the hump, and specially retarders in *Summary No. 12*, or even better still in between *Summaries No. 12 and 13*.

After a discussion in which took also part M. HOLVID (*Swedish State Railways*) and M. MARIN, it was decided to add between *Summaries 12 and 13*, a *Summary 12a* worded as follows :

« 12a. — Installations where the shunting output can be increased contribute to the reduction in cost per wagon shunted.

« The majority of Administrations are of the opinion that retarders are one of the best means to resolve this problem. »

— *Summary No. 15* was then adopted without any alteration.

*Summaries Nos. 16 and 17* relating to

*Train formation* were then read out and both were adopted as follows :

#### *Summary No. 16 :*

16. A general preliminary programme for the making up of trains, adapted to day-to-day requirements, by the yard management, is extremely desirable.

#### *Summary No. 17 :*

17. In most of the countries consulted the making up of trains conveying traffic for more than one destination is left entirely to the yard staff. It is, however, desirable to organise this work on rational lines; with this object in view, some countries have already made use of « simultaneous making up » which saves about 50 % of the time previously required for this operation.

M. LAMARQUE informed the Delegates who are particularly interested in the « simultaneous making up of trains » that he could provide them with a detailed report on the subject which had been compiled by the S. N. C. F. for the Department interested.

#### **Meeting held on September 27th. 1950.**

The PRESIDENT opened the meeting at 9.15 a. m. and M. CIRILLO then read out *Summary No. 18*.

M. VANDERBORGH asked whether the words « as a rule » were really necessary; M. CIRILLO said that they were, since it is only the opinion of the majority and not of all the Administrations which is contained in this conclusion.

Mr. ROSTERN thought that this question specially covered large marshalling yards which are opened normally all the year round and suggested that this should be included in the text.

A discussion between MM. MOULART, LAMARQUE, BARRINGTON-WARD and the PRESIDENT ensued and it was then decided to keep the text, as follows :

**III. Economies to be made when the number of wagons to be dealt with is less than the full capacity of the marshalling yards.**

*Summary No. 18 :*

**18. Temporary reductions in traffic.**

Temporary reductions in the movement of traffic through marshalling yards which are normally open continuously can, as a rule, be accompanied by important economies following the closure of the sorting and formation sidings for not more than 24 hours at the beginning of the week, the periods of closure being staggered to provide a few hours overlap.

*Summary No. 19* was then read out and adopted as given hereafter :

*Summary No. 19 :*

**19. Permanent reduction in the traffic.**

If there is a permanent falling off in traffic, the necessary economies can be obtained either by reducing the shunting capacity by means of a decrease in the number of men and shunting engines employed, or by closing one or more parts of the yard for one shift per day or even two in exceptional cases. If the decline is maintained or the traffic continues to fall, it becomes necessary to reconsider the whole problem in the light of traffic requirements in order to determine the purpose which the yards should serve in the general plan and traffic movement.

The Meeting then went on to *Chapter IV*:

**IV. Staff.**

*Summary No. 20 :*

**20. Training and selection of staff.**

The high output of marshalling yards

depends to a very large extent on the professional skill and efficient work of the men employed there.

For this reason extensive professional instruction and the careful selection of certain specialised staff, in particular the skid brakesmen, has given excellent results, wherever it has been introduced.

M. VANDERBORGH thought it was desirable to make special reference to the careful selection of the management of the yards in order to ensure an efficient output.

MM. CIRILLO and LAMARQUE were, together with all the other Delegates, in agreement on this point but a discussion followed as to where the addition was to be inserted. The English Delegates, and specially Messrs. ALLEN and BARRINGTON-WARD, insisted that this point be covered in a separate paragraph.

It was finally decided to add the following paragraph to *Summary No. 20*.

« Careful selection of the supervisory staff is also necessary. »

— The *Summary No. 20* so completed was adopted.

*Summary No. 21 :*

**21. Output premiums.**

It appears advisable to interest the shunters in the output of work by introducing premiums, varying from day to day if possible, according to the quality of the work (less damage, delays, etc.) and the actual output obtained (number of men, shunting engine hours per wagon dealt with, etc.).

Mr. ALLEN suggested that this summary be cancelled as, in his opinion, it is extremely difficult to put into force a bonus system since too many factors have to be taken into consideration. Anyway, this bonus system should not be limited

to shunters as all the yard staff (pointsmen, train drivers, etc.) are also connected with the efficient working of the yard. It is preferable to rely in the selection and training of staff on their interest in their work rather than on a system of incentive bonuses. Such bonus systems may well work in large factories where all the staff each have a direct interest in production, but this is not the case so far as marshalling yards are concerned.

M. LAMALLE considered that, on the contrary, from the social point of view it was desirable to have such a bonus system and that this must make adequate allowance for the dangerous nature of shunting work.

M. CIRILLO fully appreciated the British point of view which has already been put forward in connection with other enquiries, and notably in connection with an enquiry by the International Union of Railways. Nevertheless, there are several Administrations who have already put into force incentive bonus systems and others who are tending in this direction. The conclusion must, therefore, bring out these considerations.

Mr. ROSTERN then suggested that the conclusion should commence with the words « in certain countries it would seem desirable... » and to modify the English translation of the term « agents de manœuvre » in such a way as to convey a more general meaning (the yard staff as a whole instead of shunters only).

Mr. David BLEE (*British Railways*) who was not able to see how it was possible to estimate for certain the reduction in the number of damaged wagons, was

willing to accept the solution put forward by Mr. ROSTERN since it was merely a statement of fact.

After further discussion in which MM. LAMARQUE, BARRINGTON-WARD, CIRILLO, WATKINS and PICKFORD took part, the PRESIDENT put the proposal to the vote that the beginning of *Summary No. 21* should be redrafted as follows :

« The majority of the Administrations consulted are of the opinion that it is desirable... »

This proposition received eleven votes in favour and nine were against.

Since many members had abstained from voting the PRESIDENT thought that it was his duty to reopen the discussion on this question.

M. HOLVID thought that it would be possible to reconcile the diverse points of view by considering them against a broader background and regarding them in relation to the basis of payment as a whole of the shunting staff, and not merely as incentive bonus systems.

After further discussions, particularly by MM. DELACARTE, ALLEN and CIRILLO, M. MOULART proposed the following compromise text.

« 21. — Some railways have adopted with success systems of incentive bonuses which take into account the output and quality of the day's work.

« The majority of the Administrations are in favour of this idea. »

The PRESIDENT put this proposal to the vote and Mr. BARRINGTON-WARD declared that, since, in this form, it was no more than a statement of fact he had no further objections against it.

*Summary No. 21* was then adopted in the revised form set out.

The Meeting then went on to *Chapter V*:

#### V. Comparison and general control of the results obtained.

*Summary No. 22* :

##### 22. Output factors for the yard and their comparison.

The factors most likely to give a measure of the output of a marshalling yard are:

- the average time elapsing between the arrival of a wagon in the yard and the time it is ready to leave;

- the number of wagons shunted per shunting engine hour;

- the total number of men employed in the yard compared with the number of wagons dealt with.

But these different factors are hard to compare as between one yard and another, and really are only useful for making a comparison between the output of the same yard at different periods.

M. VANDERBORGH considered that it would be desirable to add to the list of factors set out in the summary a further important point :

« Percentage of wagons damaged in relation to wagons shunted. »

M. HOLVID wondered if the first factor mentioned (average time) was a true measurement of output, since the timings of the trains were an important element in the duration of the stay of the wagons in the marshalling yards and the average time could vary considerably.

M. LAMARQUE acknowledged the significance of M. HOLVID's observation and was willing to modify the text to read « ready for the first train to leave » instead of « ready to leave the yard ».

M. LAMALLE, on the contrary, thought that it was the moment when the wagons are ready to leave which is an important factor.

After further discussion the phrase « ready to leave » was finally adopted.

*Summary No. 22* amended accordingly was adopted.

The last *Summary No. 23* was then read out and adopted as follows :

##### 23. General control of the results obtained.

Effective and constant control of the work must be maintained at all levels in order to keep up the efficiency of the yard in all its phases.

This control, which is based on the appropriate documents and statistics, must above all make it possible to adapt the different resources of the yard and the train services to the actual traffic requirements.

The study of the various summaries having been concluded, the PRESIDENT declared the following summaries adopted:

### SUMMARIES.

#### I. General output of the yard.

##### 1. Labelling wagons.

« The use by the sending station of coded wagon labels showing the destination station and legible at a distance facilitates, on railways of some importance or with numerous lines, the work of the yard staff and reduces the risk of wagons going astray.

##### 2. Notification.

« Preliminary notification of certain details of the composition of incom-

“ ing trains enables the yard better to  
“ estimate and organise its work.

### *3. Timetables.*

“ Though the timetables must be fixed  
“ first of all in such a way as to ensure  
“ the best forwarding arrangement for  
“ the wagons and most satisfactory ser-  
“ vices, they must also as far as possible  
“ take into consideration the maximum  
“ output of the yard, especially when  
“ there are insufficient reception or  
“ departure sidings.

### *4. Allocation of sidings.*

“ Careful allocation of the marshall-  
“ ling sidings, based upon the layout of  
“ the yard and the kinds of train to be  
“ made up with the wagons shunted, has  
“ produced good results on the turn-  
“ over of the yard.

### *5. Co-ordination and control of the operations of the yard. Use of equipment according to requirements.*

“ Co-ordination of the different oper-  
“ ations carried out in the yard is  
“ essential for good output.

“ This is assured in the first place by  
“ the preparation of preliminary working  
“ programmes or harmonograms show-  
“ ing the way the different engines and  
“ gangs of the various parts of the yard  
“ are to be used in each shift.

“ These programmes will particularly  
“ provide for the carrying out of certain  
“ preliminary operations to be done at  
“ the same time and which are required  
“ for shunting.

“ At the same time, the concentration

“ of all useful data in the hands of  
“ the yardmaster with the necessary  
“ extensive telephonic communications  
“ throughout the yard makes it possible  
“ to carry out the programme to the  
“ best possible extent.

“ In order to carry out these meas-  
“ ures, a “ control post ” appears to be  
“ very desirable in large marshalling  
“ yards, especially if these have several  
“ independent yards.

### *Shunting engines.*

“ 6. The shunting engines used in  
“ marshalling yards must be of a suit-  
“ able type for the special work required  
“ of them. The Diesel engine has prov-  
“ ed its worth wherever it has been used,  
“ from the point of view of having a  
“ higher output and greater flexibility  
“ than the steam locomotive.

“ 7. In the case of steam locomotives,  
“ it is necessary to take special steps to  
“ minimise interruptions due to the  
“ need to refuel or for maintenance  
“ purposes. In almost every case it is  
“ of value to install a fuelling point in  
“ the yard where water and coal can be  
“ taken.

“ 8. In principle the use of train  
“ engines for shunting is not to be  
“ recommended except in the case of  
“ certain special operations of limited  
“ importance.

“ 9. The proper use of shunting  
“ engines which is shown by the number  
“ of wagons shunted per hour can lead  
“ to considerable economies; it must be  
“ watched from day to day by the  
“ management of the yard and by the

« « control post » dealt with under « summary No. 5.

## II. Efficiency of the special operations carried out in the yard.

### 10. Numbertaking.

« Careful checking of wagons on arrival and departure provides great advantages. It is also recommended that the numbertakers should prepare cut cards and shunting lists. Finally, certain regulations regarding the numbertaking should be of great use in large yards.

### 11. Wagon examination and repairs.

« In general it is as well to make a complete examination of the wagons on the actual reception sidings so that damaged wagons can be sent direct to a special siding when they are shunted; the second check before departure is only to detect wagons which may have been damaged while in marshalling yards.

« In the large marshalling yards, certain sidings (the outer ones as a general rule) can be usefully allocated for very small repairs, provided that the essential safety precautions are taken.

### Shunting.

« 12. The speed of shunting depends upon the layout and the facilities provided, the prevailing weather conditions (and in some cases the composition of the train to be shunted). These points being taken into account, the speed selected should be the maximum speed which allows the wagons

« to run into the marshalling sidings with the greatest regularity and the minimum of wrong shunts and over-takings.

« 12 a). Installations where the shunting output can be increased contribute to the reduction in cost per wagon shunted. The majority of administrations are of the opinion that retarders are one of the best means to resolve this problem.

« 13. The driver, the man in charge of the hump, the pointsmen and all the shunting staff should be in close communication with each other by visual and oral means, and also by telecommunications.

« 14. The prevention of lost time and accidents is of the greatest importance from the point of view of the general output of the yard. In particular, care must be taken to reduce to the minimum any interruptions to the shunting, specially, by taking steps to deal with the refuelling of the engines on the site, the closing up of wagons in the sidings and the reduction in the numbers of wrong shunts.

### 15. Braking and skid braking.

« Overtaking, rough shunts and damage must be reduced to the absolute minimum by suitable braking and skid braking methods.

« In yards equipped with retarders the best solution is generally :

« on the one hand, to reduce the speed of the wagons by means of retarders;

« on the other hand, to stop them

“ by means of hand operated skids in  
“ the siding, immediately behind and as  
“ near as possible to the last wagon  
“ shunted.

“ In yards not equipped with retarders  
“ the spacing of the wagons is generally  
“ carried out by special apparatus or  
“ hand operated skids, which are thrown  
“ clear of the rails; the wagons are stop-  
“ ped at the end of the siding by hand  
“ operated skids as in the previous case.

#### *Train formations.*

“ 16. A general preliminary pro-  
“ gramme for the making up of trains,  
“ adapted to day-to-day requirements,  
“ by the yard management, is extremely  
“ desirable.

“ 17. In most of the countries con-  
“ sulted the making up of trains con-  
“ veying traffic for more than one desti-  
“ nation is left entirely to the yard staff.  
“ It is, however, desirable to organise  
“ this work on rational lines; with this  
“ object in view, some countries have  
“ already made use of “ simultaneous  
“ making up ” which saves about 50 %  
“ of the time previously required for this  
“ operation.

### **III. Economies to be made when the number of wagons to be dealt with is less than the full capacity of the marshalling yards.**

#### *18. Temporary reductions in traffic.*

“ Temporary reductions in the move-  
“ ment of traffic through marshalling  
“ yards which are normally open con-  
“ tinuously can, as a rule, be accom-  
“ panied by important economies fol-  
“ lowing the closure of the sorting and

“ formation sidings for not more than  
“ 24 h. at the beginning of the week,  
“ the periods of closure being staggered  
“ to provide a few hours overlap.

#### *19. Permanent reduction in the traffic.*

“ If there is a permanent falling off  
“ in traffic, the necessary economies can  
“ be obtained either by reducing the  
“ shunting capacity by means of a  
“ decrease in the number of men and  
“ shunting engines employed, or by clos-  
“ ing one or more parts of the yard for  
“ one shift per day or even two in  
“ exceptional cases. If the decline is  
“ maintained or the traffic continues to  
“ fall, it becomes necessary to recon-  
“ sider the whole problem in the light  
“ of traffic requirements in order to  
“ determine the purpose which the yards  
“ should serve in the general plan and  
“ traffic movement.

### **IV. Staff.**

#### *20. Training and selection of staff.*

“ The high output of marshalling  
“ yards depends to a very large extent  
“ on the professional skill and efficient  
“ work of the staff employed.

“ For this reason extensive profes-  
“ sional instruction and the careful  
“ selection of certain specialised staff,  
“ in particular the skid brakesmen, has  
“ been found to give excellent results  
“ wherever it has been introduced.

“ Careful selection of the supervisory  
“ staff is also necessary.

#### *21. Output premiums.*

“ Some railways have adopted with  
“ success systems of incentive bonuses  
“ which take into account the out-

“ put and quality of the day's work.

“ The majority of the Administrations  
“ are in favour of this idea.

#### V. Comparison and general control of the results obtained.

##### 22. Factors influencing the output of the yards and comparative results.

“ The factors most likely to give a measure of the output of a marshalling yard are :

“ a) the average time elapsing between the arrival of a wagon in the yard and the time it is ready to leave;  
“ b) the number of wagons shunted per shunting engine hour;

“ c) the total number of men employed in the yard compared with the number of wagons dealt with;

“ d) percentage of wagons damaged in relation to wagons shunted.

“ It is, however, difficult to draw comparison between one yard and another and these factors are, therefore, only really useful for the purpose of comparison between the output of the same yard at different periods.

##### 23. General control of the results obtained.

“ Effective and constant control of the work must be maintained at all levels in order to keep up the efficiency of the yard in all its phases.  
“ This control, which is based on the appropriate documents and statistics, must above all make it possible to adapt the different resources of the yard and the train services to the actual traffic requirements. ”

— The Plenary Meeting held on the 29th. September 1950 ratified these summaries.

#### QUESTION VIII.

In view of the ever increasing weight of road competition, what are the most appropriate measures, apart from reduced rates, for keeping traffic by full wagon loads in the hands of the railway ?

Would not road transport at the end of the railway journey be justified in order to get direct contact with clients who are not connected up by railway sidings ?

Should not the road vehicles required to assure such transport be attached to centre stations, equipped with suitable handling equipment, from which the road transport services would start ?

Choice of the vehicles to be used.

##### Preliminary documents.

Report (Belgium and Colony, Denmark, France and Colonies, Luxemburg, Netherlands and Colonies, Norway, Poland, Switzerland and Syria), by J. GIRETTE (See *Bulletin*, April 1950, p. 325 or separate issue No. 7.)

Report (America (North and South), Burma, China, Costa Rica, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iraq, Iran, Malayan States, Pakistan), by A. A. HARRISON. (See *Bulletin*, May 1950, p. 775 or separate issue No. 15.)

Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey and Yugoslavia), by Mario DIAS TRIGO. (See *Bulletin*, May 1950, p. 809 or separate issue No. 16.)

*Special Reporter : P. MAROIS.* (See *Bulletin*, October 1950, p. 2096.)

### Report of Section III.

(See *Daily Journal of the Session* : No. 6, p. 8 to 11; No. 7, pp. 3-4; No. 8, p. 1.)

#### Meeting held on October 2nd., 1950.

The PRESIDENT after underlining the fact that this question had been covered by three most interesting reports, called upon M. MAROIS, *Special Reporter*, to address the meeting.

M. MAROIS made special reference to the points which had guided the various Reporters in their study and which could be set out under three separate headings :

(1) Reduction of terminal costs, one of the means to achieve this being the concentration of traffic at certain stations.

(2) Methods to be used in door-to-door technique, particularly containers, road-rail vehicles, etc.

(3) Other methods to achieve the desired object, such as better train services, letting of sites, etc.

This study had resulted in a certain number of summaries which are embodied in M. MAROIS' special report. *Summary No. 1* was then read.

#### *Summary No. 1 :*

1. Some railways consider that the use of lorries for haulage services, by extending their radius of action, now makes it possible to concentrate the traffic in a certain number of well equipped station centres, by using motor haulage services over longer distances, and that this organisation will definitely lead to economies.

But although many theoretical studies of this idea have been put forward, it does not appear to have been the object of practical trials, except in the case of parcels traffic. It appears very desirable that such trials

should be undertaken as soon as possible by different railways and the results published, so that everyone can profit by their experience.

M. MOULART (*Société Nationale des Chemins de fer belges*) suggested that *Summary No. 3*, to which greater importance should be given, ought to be transposed with *Summary No. 1*, since the essential element in the question under review was, in short, the high cost of terminal operations.

Messrs. BLEE and ELLIOT (*British Railways*) did not see the need for this, since it would place too great an emphasis on one single economic factor which was not the only one of importance.

A discussion then ensued between several delegates, including the PRESIDENT and M. DELACARTE (*Société Nationale des Chemins de fer français*) and finally, *Summary No. 1* was adopted without any attention.

M. MAROIS then took the opportunity of asking the various delegates whether their Administrations will eventually consider the concentration of traffic in centre-stations. MM. MARIN (*Chemins de fer de l'Etat, Italie*), VANDERBORGHT (*Société Nationale des Chemins de fer belges*), TRIBELHORN (*Chemins de fer fédéraux, Suisse*) and VARJONEN (*Chemins de fer de l'Etat, Finlande*) then gave some details in regard to the experiments now being carried out by their respective Administrations.

#### *Summary No. 2 :*

2. The general opinion appears to be in any case that if the traffic is concentrated in this way in the station centres and the haulage services extended, it is necessary for the railway to have commercial control

over such services, if there is to be no risk of losing the traffic at each end owing to competition.

M. DE ESPREGUEIRA MENDES (*Portuguese Railways*) suggested that the word « commercial » be replaced by the word « direct » which, in his opinion, outlines better the nature of the control which the railways should exercise.

M. VANDERBORGHT suggested that the word « control » alone should be in the text.

Following a discussion, and after M. MAROIS had outlined the different ways in which the railways could intervene in this respect, the word « commercial » was deleted and *Summary No. 2* was adopted with this modification.

#### *Summary No. 3 :*

3. The attention of the Congress should be drawn to the importance of the terminal transport as regards the cost of transport between clients who are not linked up with the railway. The reduction of the cost of such terminal transport is probably of greater interest to the railway than reduction in the cost of transport by rail.

Mr. BLEE repeated what he had said previously, following M. MOULART's remark on *Summary No. 1*; in his opinion it was not necessary to draw special attention to economies to be made on terminal transport services, as other economies, for instance, those in regard to the use of wagons, locomotives and train staff, etc., are also determinating factors in the total cost of transport.

M. GIRETTE, *Reporter*, pointed out that M. MAROIS' report drew attention to the fact that terminal transport doubles the rail cost when the distances are in the

region of 200 km. It is therefore specially desirable that for such distances reductions should be made in the cost of terminal transport. In dealing with this problem, in general terms, as suggested by Mr. BLEE, it is essential not to forget the importance of this aspect of the question.

Following a discussion during which MM. MAROIS, MOULART, VANDERBORGHT, BLEE and DELACARTE took part, M. MAROIS suggested that the second sentence should be redrafted.

— This proposal was agreed and *Summary No. 3* adopted with the following modified text :

« 3. The attention of the Congress should be drawn to the importance of terminal transport as regards the cost of transport between clients who are not linked up with the railway. The reduction in the cost of terminal operations, whether they be in the handling at stations or in the haulage between the station and the premises of the clients is of considerable importance, increasing when short distances are involved. »

#### *Summary No. 4 :*

4. Terminal transport can be assured by the railway itself, but the Reports seem to show that in the case of the full load traffic, such services are poorly used by clients who prefer private haulage.

M. MAROIS suggested that the text should be slightly modified. The words « clients prefer to use private haulage » should replace « such services are probably used by clients who prefer private haulage. »

M. MOULART said that he would like to see this summary deleted, since it

shows weakness on the part of the railways and could be a weapon in the hands of competing services.

M. GIRETTE, on the other hand, was of the opinion that, in the summary, one should bring out the growing importance of private transport and that this was a general phenomenon which it was vital to note.

Mr. BLEE also subscribed to this point of view.

M. BARBAUT (*Compagnie fermière des Chemins de fer tunisiens*) considered also that it was desirable to retain this summary, but that care should be taken, however, to avoid the use of the term « private transport », as this appeared to him ambiguous. Does it refer to haulage work undertaken by vehicles belonging to the trader, or to public service vehicles operated by private undertakings?

After considerable discussion on the various aspects, in which MM. ELLIOT, HAMMETT (*British Railways*), and HARRISON, *Reporter*, took part, M. MAROIS put forward the following text for *Summary No. 4*, which was approved by the delegates present :

« 4. Terminal transport can be provided by the railway itself, but regard must be paid to the wishes of certain traders to use either their own lorries or lorries operated by a public haulage firm. »

#### *Summary No. 5 :*

5. Attention is drawn to the mutual interest of the railway and public road hauliers in defending themselves against private transport. This community of interest between the public haulier and the railway could surely be used to organise cheaper door to door services.

This question however does not appear to arise in certain countries, such as Great Britain and Bulgaria, where the regulations adopted have gone further in advancing the problem of the coordination of methods of transport.

M. VANDERBORGH suggested that the first paragraph should be redrafted in a condensed form, which was accepted by the meeting, subject to the substitution, at the request of M. DELACARTE, of the words « public haulage transport » by « public road transport undertaking ».

— *Summary No. 5* was adopted with the following modified text :

« 5. Public road transport undertakings, like the railways, have to protect themselves against competition by throughout transport from traders' own vehicles, and in view of this, it should be possible to reduce to the minimum door-to-door costs. »

#### *Summary No. 6 :*

6. Experience has shown the value of the door to door technique which is the essential advantage of the motor vehicle. The oldest solution to the problem on the railway is the private siding. It would appear to be to the interest of the railway to do all it can to increase the number of such sidings. Certain railways appear to be in this respect much more ahead than others.

M. DE ESPREGUEIRA MEMDES emphasised the value of private sidings and intimated that, in Portugal, the railways were prepared to make a contribution towards the construction of certain private sidings and even in certain cases to be responsible for the entire cost, when the trader undertook to forward a substantial volume of traffic. He desired, therefore, that this circumstance should be covered in *Summary No. 6*.

M. BLEE considered that this addition was not appropriate, since the views of the various Administrations as to the desirability of contributing towards the cost of providing private sidings, were extremely diverse and impossible to reconcile. In Great Britain, for instance, such contributions would not be considered, because it is in the interests of traders themselves to have a direct rail connection; a private siding offers them many advantages, particularly from the point of view of handling and storing. There was no reason for the railway to undertake to accept further financial burdens by being willing to share in the capital cost of providing private sidings.

M. GIRETTE observed that if, in Great Britain, there were possibilities of extending the construction of private sidings without the railways being obliged to undertake financial commitments, this was not so in many other countries. It was, therefore, appropriate to record the possibilities of railways offering to accept responsibility for part of the cost of construction in order to develop still further this form of door-to-door transport.

M. MAROIS suggested, in order to set at rest the fears expressed by Mr. BLEE, that the proposal put forward by the Portuguese delegate should be accepted as a simple statement of fact in regard to the actual position in certain countries. The revised wording could, he thought, be as follows :

« Some railways go so far as to accept liability for part of the cost of constructing private sidings on the understanding that an adequate volume of traffic is guaranteed by the trader. »

Mr. BLEE insisted, however, that even with this modified wording, such a statement should not be inserted in the summaries since some large undertakings, particularly those with international ramifications, and who are always well informed, would thereby be in a strong position to argue a case to obtain the same favourable conditions.

M. BARBAUT thought that, if this argument were to be effectively used by certain traders, the railways would equally be able to use it vis-à-vis the authorities which determine their own financial position.

A long discussion ensued on this subject and, in view of the impossibility of completely reconciling the various points of view, the PRESIDENT put M. MAROIS' proposal before the meeting, and it was adopted by a majority vote.

*Summary No. 6* was finally adopted in the following form :

« 6. Experience has shown the value of the door-to-door technique which is the essential advantage of the motor vehicle. The oldest solution to the problem on the railway is the private siding. It would appear to be to the interest of the railway to do all it can to increase the number of such sidings. Certain railways appear to be in this respect much more ahead than others. Some railways are prepared to share in the capital costs of providing private sidings on condition that the traders concerned guarantee an adequate volume of traffic. »

*Summary No. 7 :*

7. When clients are not linked up by private sidings, the railway does not seem to

have taken sufficient interest to date in the other methods which enable the door-to-door technique to be obtained, using the railway for the main part of the journey. It would appear advisable to make great efforts in this direction.

— Adopted without modification.

#### *Summary No. 8 :*

8. This effort would involve not only capital investment, but also commercial organisation. Clients must find available at the railway station all the facilities obtained from its competitors, and the railway should collect and deliver goods just like the road haulier. It is found that when the railway confines itself to perfecting technical arrangements and informing its clients about them, it does not get any results. Experience in Great Britain, from this point of view in connection with door to door services, shows in the clearest way the results that can be obtained with a proper commercial organisation.

— Adopted without remark.

#### **Meeting held on October 3rd., 1950.**

— *The meeting was opened at 9.30 a. m.*

M. MAROIS read out *Summaries Nos. 9 and 10.*

#### *Summary No. 9 :*

9. A certain number of solutions making door-to-door transport possible have been perfected : containers, rail-road trailers, wagon-conveying-trailers. It seems that up to date experience does not warrant the recommendation of one rather than another of these solutions. The different railways should continue their trials. It is not certain that a single solution can solve all the problems arising. In the end, it is the client who is the best judge of what suits him, and he should not be forced to adopt one solution rather than another when experience shows that they all have their uses. It is necessary however, for economic operation, only to have a small number of types of no matter what solution adopted.

— Adopted without alteration.

#### *Summary No. 10 :*

10. In addition, it seems essential that the railway should so organise its operation that the wagons used for the transport of containers or rail-road trailers should have a good user. Careful grouping of such traffic is essential if cost is to be such that attractively low prices can be offered to clients.

— Adopted without modification.

#### *Summary No. 11 :*

11. In the fight against competition, the railway should not neglect other improvements to its services capable of inducing clients to choose it in preference to other methods of transport. Safety, rapidity and regularity of transport should all be increased. Timetables which enable the traffic to leave and arrive at the most suitable hours are of greater value than actual speed. For example, there is no benefit in saving a few hours on the transport of food-stuffs if this saving will not enable them to be available as soon as the markets open.

M. MAROIS suggested that a slight alteration be made in the last sentence where the word « client » occurs in the French text. It is important that the traders should be able to place the goods at the market in good time. The wording in the French text « mettre en vente au début du marché » would be preferable, this means substituting the following words for the last line of the English text :

« the trader to place his goods on the market in good time. »

This alteration was accepted.

— *Summary No. 11 was adopted with this modification.*

#### *Summary No. 12 :*

12. The building of special wagons adapted to special requirements is also another way of retaining railway traffic. Opinion seems to be divided concerning the value of

including such special wagons in the ordinary stock, or encouraging the private firms making use of them to build their own.

M. DELACARTE remarked that in the wording proposed the summary did not allow for the possibility of making use of private wagons supplied by special undertakings.

A discussion then ensued during which MM. MOULART, MAROIS, ELLIOT, BRUGERE (*Compagnie fermière des Chemins de fer tunisiens*) and HARRISON took part. Mr. HARRISON then proposed the following alteration, which was accepted :

« or encouraging the use of such wagons provided by the clients or by private undertakings from which they hire them. »

— *Summary No. 12* was adopted as follows :

« 12. The building of special wagons adapted to special requirements is another way of retaining railway traffic. Opinion is divided concerning the value of including such special wagons in the ordinary stock or encouraging the use of such wagons provided by the clients or by private undertakings from which they hire them. »

#### *Summary No. 13 :*

13. It is to be recommended that all facilities be provided at railway stations that their size and layout make possible. The renting of sites and providing of handling gear are of the greatest interest.

Mr. HARRISON suggested the substitution of the word « letting » for the word « renting » in the English text. This will be taken into consideration in the final text.

M. BARBAUT thought that the second

sentence in the summary is a little restrictive and suggested referring to the possibility of providing free sites and of using certain existing lines as private sidings.

Mr. ELLIOT suggested that, in view of what had previously been said regarding private sidings, it was inadvisable to refer to the provision of free sites.

Certain slight alterations were made and the text was finally adopted as follows :

« 13. It is recommended that all facilities should be provided at railway stations which their size and layout permit, for example, the letting of sites and the provision of handling equipment. »

#### *Summary No. 14 :*

14. Finally, the attention of the Congress should be drawn once again to the importance of the general organisation of transport. Mr. HARRISON recalls that the President of the British Transport Commission recently stated that « it is not inopportune to point out to commercial and industrial firms in general, and to those proposing to make use of private transport in particular, that public transport cannot carry on and be self-supporting unless it has a sufficient number of clients to whom it is in a position to supply a good service ».

If commercial and industrial firms make use of their own vehicles to transport the goods in question and only send the bulky and less paying goods by rail, there is no doubt but that the cost of public transport will increase in a way that in the end will be detrimental to general economy.

In proceeding to *Summary No. 14* the SPECIAL REPORTER drew the attention of the assembly to the general character of this last summary. After the text had been read M. MOULART asked for the adoption of a more concise text which he furnished. He pointed out that it was

not the custom of the Congress to quote particular opinions or parts of reports, but that the delegates should express the consensus of opinion.

M. MARIN shared M. MOULART's point of view. Whilst recognising that *Summary No. 14* expressed a proper point of view, he would prefer a version which brought out that the main objective is really the co-ordinating of transport. He proposed a text which would develop this idea, insisting upon the need to arrive at a redistribution of traffic among the different forms of transport based upon cost, taking into account different elements of cost not forgetting conditions of employment.

M. MAROIS recognised that the observations of MM. MOULART and MARIN were well founded and appreciated that it was necessary to present a text in wider terms. On the other hand, he was of the opinion that it would be useful to add a sentence on this important question with the object of bringing it to the notice of public authorities.

After further discussion shared by MM. MAROIS, HARRISON, ELLIOT and GIRETTE, the following text which brings together the various proposals was adopted as *Summary No. 14* :

« 14. Finally, attention should be drawn once again to the importance of the general relationship of transport, both public and private. It is necessary to convince public opinion that undue use of private transport for traffic which pays best is contrary to general economy. This not only leaves public transport with the less paying traffic but also reduces the total traffic entrusted to it and increases, in

effect, the cost of transport to the public as a whole.

« It is for the Public Authorities to draw proper conclusions from this statement of the situation. »

The PRESIDENT noted with pleasure that the works of the Section were finished as Question IX had been studied during the meetings of the 27th. and 28th. September and he thanked all the delegates and the reporters for the important work which they had carried out in this connection, and specially M. MAROIS who had helped to smooth out many difficulties.

Mr. ELLIOT, on behalf of all the delegates, wanted to underline the delicate problems which the assembly had had to solve and thanked the PRESIDENT, whose patience he appreciated, and M. MAROIS due to whose competence the debate was successfully carried out.

The PRESIDENT stated that the following summaries were adopted :

### SUMMARIES.

« 1. Some railways consider that the use of lorries for haulage services, by extending their radius of action, now makes it possible to concentrate the traffic in a certain number of well equipped station centres, by using motor haulage services over longer distances, and that this organisation will definitely lead to economies.

« But although many theoretical studies of this idea have been put forward, it does not appear to have been the object of practical trials, except in

“ the case of parcels traffic. It appears very desirable that such trials should be undertaken as soon as possible by different railways and the results published, so that everyone can profit by their experience.

“ 2. The general opinion appears to be in any case that if the traffic is concentrated in this way in the station centres and the haulage services extended, it is necessary for the railway to have control over such services, if there is to be no risk of losing the traffic at each end owing to competition.

“ 3. The attention of the Congress should be drawn to the importance of terminal transport as regards the cost of transport between clients who are not linked up with the railway. The reduction in the cost of terminal operations, whether they be in the handling at stations or in the haulage between the station and the premises of the clients is of considerable importance, increasing when short distances are involved.

“ 4. Terminal transport can be provided by the railway itself, but regard must be paid to the wishes of certain traders to use either their own lorries or lorries operated by a public haulage firm.

“ 5. Public road transport undertakings, like the railways, have to protect themselves against competition by throughout transport in traders' own vehicles, and in view of this, it should be possible to reduce to the minimum door-to-door costs.

“ 6. Experience has shown the value of the door-to-door technique which is the essential advantage of the motor vehicle. The oldest solution to the problem on the railway is the private siding. It would appear to be to the interest of the railway to do all it can to increase the number of such sidings. Certain railways appear to be in this respect much more ahead than others. Some railways are prepared to share in the capital costs of providing private sidings on condition that the traders concerned guarantee an adequate volume of traffic.

“ 7. When clients are not linked up by private sidings, the railway does not seem to have taken sufficient interest to date in the other methods which enable the door-to-door technique to be obtained, using the railway for the main part of the journey. It would appear advisable to make great efforts in this direction.

“ 8. This effort would involve not only capital investment, but also commercial organisation. Clients must find available at the railway station all the facilities obtained from its competitors, and the railway should collect and deliver goods just like the road haulier. It is found that when the railway confines itself to perfecting technical arrangements and informing its clients about them, it does not get any results. Experience in Great Britain, from this point of view in connection with door-to-door services, shows in the clearest way the results that can be obtained with a proper commercial organisation.

“ 9. A certain number of solutions making door-to-door transport possible have been perfected: containers, rail-road trailers, wagon-conveying-trailers. It seems that up to date experience does not warrant the recommendation of one rather than another of these solutions. The different railways should continue their trials. It is not certain that a single solution can solve all the problems arising. In the end, it is the client who is the best judge of what suits him, and he should not be forced to adopt one solution rather than another when experience shows that they all have their uses. It is necessary however, for economic operation, only to have a small number of types of no matter what solution adopted.

“ 10. In addition, it seems essential that the railway should so organise its operation that the wagons used for the transport of containers or rail-road trailers should have a good user. Careful grouping of such traffic is essential if the cost is to be such that attractively low prices can be offered to clients.

“ 11. In the fight against competition, the railway should not neglect other improvements to its services capable of inducing clients to choose it in preference to other methods of transport. Safety, rapidity and regularity of transport should all be increased. Time-tables which enable the traffic to leave and arrive at the most suitable hours are of greater value than actual speed. For example, there is no benefit in saving a few hours on the transport

“ of food-stuffs if this saving will not enable the trader to place his goods on the market in good time.

“ 12. The building of special wagons adapted to special requirements is another way of retaining railway traffic. Opinion is divided concerning the value of including such special wagon in the ordinary stock or encouraging the use of such wagons provided by the clients or by private undertakings from which they hire them.

“ 13. It is recommended that all facilities should be provided at railway stations which their size and layout permit, for example, the letting of sites and the provision of handling equipment.

“ 14. Finally, attention should be drawn once again to the importance of the general relationship of transport, both public and private. It is necessary to convince public opinion that undue use of private transport for traffic which pays best is contrary to general economy. This not only leaves public transport with the less paying traffic but also reduces the total traffic entrusted to it and increases, in effect, the cost of transport to the public as a whole.

“ It is for the Public Authorities to draw proper conclusions from this statement of the situation. ”

The Plenary Meeting held on October 4th. ratified these *Summaries*.

#### QUESTION IX.

**Modern safety and signal installations (centralising apparatus for block system and signals).**

**Central electric apparatus with individual levers and « all relay » levers (all electric interlocking).**

**Automatic block-system with continuous current and coded current.**

**Light and speed signalling.**

#### Preliminary documents.

Report (Belgium and Colony, Denmark, France and Colonies, Luxemburg, Norway, Netherlands and Colonies, Poland, Switzerland and Syria), by E. J. F. DERIJCKERE. (See *Bulletin* for July 1950, p. 849, or separate issue No. 18).

Report (America, Burma, China, Egypt, Great Britain and Northern Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by H. H. DYER. (See *Bulletin* for March 1950, p. 247, or separate issue No. 5).

Report (Austria, Bulgaria, Czechoslovakia, Finland, Greece, Hungary, Italy, Portugal and Colonies, Rumania, Spain, Sweden, Turkey, Yugoslavia), by RIGO RIGHI. (See *Bulletin* for June 1950, p. 1389, or separate issue No. 28).

*Special reporter* : H. H. DYER. (See *Bulletin*, October 1950, p 2101.).

#### Report of Section III.

(See *Daily Journal of the Session* : No. 3, p. 10; No. 4, p. 3 to 7; No. 5, p. 2; No. 6, p. 8; No. 8, p. 1).

#### Meeting held on September 27th. 1950.

The PRESIDENT invited Mr. DYER, *Special Reporter*, to address the meeting. After having indicated the basis on which he had prepared his report and outlining the main features, he read Summary No. 1.

#### I. Remote control and operation of points and signals by means of relays.

##### Summary No. 1 :

1. Except in North America where special conditions obtain in that long lengths of line have been operated on the « Train Order » system, remote control of signalling by means of a coded relay system has not been used to a very large extent.

M. MARCHAND (*Société Nationale des Chemins de fer français*) asked for a revision of point No. 1 of which the French translation should read « Commande et contrôle à distance... » (Remote control).

Mr. TRAIN (*British Railways*) proposed the addition at the end of point No. 1 of the words « since station staff are required in the case of block posts ».

M. MARCHAND pointed out that this consideration was not required since it is emphasised that in the United States remote control has been developed on account of the « Train Order » system which implies the non-intervention by station staff.

M. DYER and M. RIGHI (*Reporter*) supported M. MARCHAND's view and spoke in favour of the original text.

Mr. TRAIN did not press his point further and *Summary No. 1* was agreed to without any alteration.

##### Summary No. 2 :

2. A number of other railways have, however, used the system to some extent and intend to extend the system as circumstances permit.

— Adopted without any alteration.

*Summary No. 3 :*

3. Where the system has been applied it has replaced manual block on double lines and token working on single lines and in some cases has enabled signal boxes to be dispensed with.

M. MARCHAND felt it was not opportune to give a list of the systems which remote control had replaced as it would be necessary not only to mention the token system for working on single lines, but also all the other systems as well.

The general tendency being towards the use of automatic block signalling, *Summary No. 3* could therefore be adjusted as follows :

« Remote control generally implies the use of automatic block signalling and this makes it possible to do away with present safety measures. »

After further discussion Messrs. TRAIN and DYER supported the proposal put forward by M. MARCHAND and *Summary No. 3* was adopted as above.

*Summary No. 4 :*

4. The system has been used to effect operating economy, to speed up operation and to increase safety.

M. TENTI (*Italian State Railways*) considered that it was not correct to say that the system had been adopted to increase safety, it being understood that the existing installations were quite satisfactory from the point of view of safety and could also be cheaper. The important consideration was the ability to expedite working.

M. MARCHAND supported the view put forward by M. TENTI; in Europe these

installations have primarily been devised to increase the capacity of the line.

— After a short discussion in which MM. DYER and MOULART (*Société Nationale des Chemins de fer belges*) took part, the Delegates agreed on the following wording for *Summary No. 4* :

« 4. The system has been employed to increase the capacity of lines, to secure economies in operating or to bring about greater safety. »

*Summary No. 5 :*

5. It seems that the coded relay system could only be applied economically where the signalling controlled is at a considerable distance from the controlling point. The economical distance is generally decided by the cost of the coded relay equipment as against the cost of the number of controlling circuits needed for direct control of each signalling function.

M. R. LÉVY (*Société Nationale des Chemins de fer français*) commented on the purpose of this conclusion which referred to the part played by the distance as this was not the only factor to be taken into consideration since coded relay systems had been installed on certain S. N. C. F. stations where signals were not further than 2 km. (1.2 miles). The first sentence of this conclusion could therefore be deleted and it would be necessary to take into account in any economic comparison between coded relay apparatus and ordinary apparatus, the number of operations to be provided for.

M. DYER insisted on the maintenance of this original text which, in the second part, pointed out quite clearly the importance of the cost of control circuits necessary, as a factor in any comparison.

After a lengthy discussion during which MM. TRAIN, RIGHI, FAZIO (*Italian State Railways*), DYER, LÉVI and Lt. Col. WILSON took part, the Summary was adopted in the revised form set out below :

« 5. The financial result is generally decided by the cost of the coded relay equipment as against the cost of the number of controlling circuits needed for the required number of signalling functions over the distance involved. »

*Summary No. 6 :*

6. No special maintenance arrangements have been found to be necessary and there has been no particular difficulty in obtaining suitable maintenance staff though special training is required.

— *Summary No. 6* was adopted without any change in the English text.

— The PRESIDENT closed the meeting at 12.15 p.m.

**Meeting held on September 28th., 1950.**

The meeting was opened at 9.15 a.m. and the Section started the examination of Heading II :

**II. Electric power signalling installations**  
— **Interlocked levers or free push button or switch systems.**

The PRESIDENT called upon Mr. DYER (*Special Reporter*).

Mr. DYER first suggested that « relay interlocking » should be added to Heading II and this addition was accepted. He then went on to read *Summary No. 1*.

1. Though free push button and switch systems are being used to an increasing extent it is considered that sufficient work-

ing experience has not yet been obtained to say whether such systems or the well-tried power signalling systems using miniature interlocked levers would be preferred.

M. MARCHAND criticised the wording « sufficient working experience has not yet been obtained », as he pointed out that sufficient experience had been obtained in France to definitely confirm that free push button and switch systems are preferable to interlocked levers.

Mr. DYER answered by saying that it was the opinion of the various Administrations consulted which he had expressed in his summary.

The PRESIDENT, in order to reach a compromise, suggested that the wording « certain administrations consider » should be included in the text.

M. MARCHAND went on to say that, provided the French point of view was mentioned in the report, he was in agreement with this alteration.

— *Summary No. 1* was adopted with the following modified text :

*II. Electric power signalling installations.*  
*Interlocked levers, relay interlocking,*  
*free push button or switch systems.*

« 1. Though free push button and switch systems are being used to an increasing extent certain Administrations consider that sufficient working experience has not yet been obtained to say whether such systems or the well-tried power signalling systems using miniature interlocked levers would be preferred. »

*Summary No. 2 :*

2. The advantage of the free push button or switch system would seem to lie with the

operating rather than the technical side as these systems embody a greater number of complicated circuits than a system of individual interlocked levers.

M. R. LÉVI expressed his agreement with the fact that the advantages of free push button or switch controls are, above all, of an operating character, but indicated that the Summary tended to minimise the technical advantages of these systems, which were also numerous. In certain instances, and the experience of the S. N. C. F. at a number of important signal boxes demonstrated the fact, it is possible to achieve economies ranging from 8 to 15 % in comparison with interlocked lever frames. In addition, experience has equally shown the important advantage consequent on the possibility of automatically setting up and cancelling of the routes. M. R. LÉVI wanted these facts to be mentioned in *Summary No. 2*.

Mr. DYER did not see the necessity for this refinement in wording, it being understood that this factor is one of the special characteristics of free push button systems.

M. MARCHAND was not of this opinion. This arrangement had been achieved on the S. N. C. F. at other signal boxes than those equipped with free push button systems, and it was important to draw attention to the advantages which are offered, notably in regard to the number of movements to be carried out by signalmen.

A long discussion ensued in which MM. FAZIO, TRAIN, RIGHI, ARIAS (*Chemins de fer de l'Etat, Italie*) and the PRESIDENT took part.

M. FAZIO proposed the following draft in order to draw attention in proper prospective to the operating and the technical considerations.

« The advantage of free push button or switch system over levers individually interlocked are, above all, of an operating character. »

M. R. LÉVI was agreeable to this provided that the following words were added :

« particularly if it permits the automatic setting up and cancellation of routes. »

The discussion continued, the opinion of the Delegates being evenly divided as to the desirability of completing the summary in accordance with the suggestion of M. R. LÉVI.

The summary was put to the vote, and as M. R. LÉVI received only 10 votes out of the 25 Delegates present, it could not therefore be accepted.

M. R. LÉVI then asked that the wording « certain administrations realised the extra advantages which this system gives if it permits the automatic setting up and cancellation of routes. »

The PRESIDENT said that with this wording there should be no objection to the point put forward by M. R. LÉVI.

*Summary No. 2* was then adopted with the following modified text :

« 2. The advantage of the free push button or switch system over levers individually interlocked is above all, of an operating character. Certain Administrations are specially of this opinion when the system permits the automatic setting up and cancellation of routes. »

*Summary No. 3 :*

3. It is not considered that greater technical knowledge is required on the part of the maintenance staff for maintaining free push button or switch systems than for interlocked lever systems but proper training of the staff is necessary owing to the much larger number of circuits and relays associated with push button and switch systems.

— Adopted without alteration.

*Summary No. 4 :*

4. There is little difference in the overall prime cost of the different systems or in the cost of day to day maintenance. The number of relays requiring periodical overhaul, however, is greater in the case of the push button and switch systems.

— Adopted.

*Summary No. 5 :*

5. It is considered that free push button or switch systems give rise to rather more serious and complicated problems for the traffic department in case of breakdown than with interlocked lever systems. This being so it is necessary to design the system so that a fault can be rectified quickly such as by the use of plug-in relays.

— Adopted.

*Summary No. 6 :*

6. Opinions as to whether push buttons or switches should be fitted on a geographical panel or a separate desk panel are divided.

— Adopted without discussion.

Mr. DYER then went on to Heading III of his report :

### **III. Automatic signalling. — Track circuits using permanent current or coded current.**

*Summary No. 1 :*

1. Coded current track circuits are used

*fairly extensively* in North America and to some extent in France and in new installations in Italy. Some experimental sections have been installed on a few railways and the system is under consideration by others.

— Adopted without modification.

*Summary No. 2 :*

2. Except where continuous cab signalling is being contemplated, the advantages claimed for the coded current system do not appear to compensate for the increased cost and complication except in special cases.

— Adopted without alteration.

*Summary No. 3 :*

3. There is full confidence in the correct operation of permanent current track circuits both from the point of safety and regular operation.

Mr. DYER suggested the inclusion of « coded current circuits » in the paragraph as there is also as much confidence in this type of current.

*Summary No. 3* was adopted with the following modified text :

« 3. There is full confidence in the correct operation of permanent current track circuits and coded current circuits both from the point of safety and regular operation. »

*Summary No. 4 :*

4. It is not practicable to say what maximum length of track circuit is advisable as this depends upon several variable factors such as ballast conditions and type of rail fastenings.

— Adopted without modification.

*Summary No. 5 :*

5. The train shunt is governed by the maximum variation in the ballast resistance and by the minimum value to which this

falls. Under conditions of maximum ballast resistance the train shunt cannot be higher than the minimum value to which the ballast resistance falls. The train shunt is therefore not governed by the length of a track circuit alone. Consequently actual train shunts for track circuits of various lengths cannot be given as so much depends upon other factors.

— Adopted without alteration.

*Summary No. 6 :*

6. It is fairly general practice to lay down a minimum value of train shunt below which it should never fall. A different minimum value is usually stipulated for different types of track circuit but except on a few of the railways the lowest figure is 0.15 ohm. It is considered that this value is rather lower than could be desired and consideration should be given to the best means of raising it in order to increase the safety factor.

M. R. Lévi said that he was in agreement with the text, but wondered whether there was not a misunderstanding regarding the shunt, as he pointed out that the values of train shunts vary considerably between the different Administrations. There are two distinct ideas, one being the practical shunt limit and the other the theoretical.

It appeared from the discussion and specially after certain explanations given by M. RIGHI, that it is the theoretical shunt limit which is referred to.

M. R. Lévi did not press his point, provided that the necessary alteration was included in the text.

A discussion then ensued regarding the wording of the last sentence of the summary, between MM. MARCHAND, R. Lévi, DYER and RIGHI. The definition « train shunt » leads to confusion and should therefore be replaced by a more precise term.

M. DELACARTE pointed out that if the resistance of the track circuit is increased beyond 0.15 ohms it offers, from an operating point of view, an advantage which should be mentioned. It would allow light vehicles, such as rail cars, to run on lines thus equipped with the same safety factor while the running of these vehicles is at present impossible unless special precautions are taken.

Mr. DYER considered it dangerous to confirm that an increase in the value of the minimum shunt would permit of the operation under satisfactory conditions of the special types of vehicles mentioned by M. DELACARTE.

In order to avoid prolonged discussion on this point the PRESIDENT asked the French Delegates whether they would be good enough to prepare in co-operation with M. RIGHI a text which would not be so definite and to give rise to any objection on the part of Mr. DYER.

*Summary No. 6 was therefore left in abeyance.*

Mr. DYER then read Heading IV of his report :

**IV. Light signalling. — Signalling for direction and speed.**

*Summary No. 1 :*

1. The systems of light signalling used by the different railways vary so much and each railway, owing to the amount of signalling already in use, is so committed to its own system that it would not be practicable to adopt a uniform system for all railways even if a common system could be agreed upon.

— Adopted.

*Summary No. 2 :*

2. The majority of the railways use a system of speed signalling, some of them giving no indication of direction whilst others combine with their speed signalling some indication of the route to be taken. This is done in different ways, often by means of a series of conventional rulings combining the ideas of speed and direction in an arbitrary manner. This complicates the reading of the signals.

Other railways, notably the British, do not have speed signalling but use a system of four simple running aspects indicating danger, caution, preliminary caution and clear, with a direction indication at the home signal at a diverging junction.

Some of the advocates of speed signalling not giving any positive indication of the direction to be taken by a train at a diverging junction claim that a reduced speed indication does in fact give an indirect indication of the route set up.

If the signal indication given for a train approaching a junction set for a diverging route can be the same as that given for the straight route, for example with signals ahead of the junction at danger, then this claim cannot be substantiated.

The second and third sentences of the summary were both criticised by M. TENTI who regarded the word « arbitrary » as too strong and by M. MARCHAND who considered that it was unfair to railways which had a very complete signalling system, to say that this complicated the reading of the signals.

Mr. ELLIOT (*British Railways*), however, supported the text originally put forward since, in experience of British Railways, on which the density of traffic was in some cases the greatest in the world, it was not necessary to have any system of speed signalling. Mr. ELLIOT firmly believed that this latter complication rendered more difficult the reading of the signals.

M. MARCHAND contended that if certain railway systems, unlike the British Railways, had adopted this form of signalling, it was in order to increase the safety factor, and he believed that certain accidents in Great Britain had arisen through the absence of any system of speed signalling.

Lt. Col. WILSON contested this suggestion; it was true that certain accidents were the result of excessive speed, but this does not mean that they were the outcome of the lack of speed signalling.

Lt. Col. WILSON added that the more complicated the signal system the greater is the risk of accidents. He felt that he should draw attention to the fact that in certain countries, such as the United States, where elaborate signalling is in force, there is a tendency to revert to a greater degree of simplicity.

M. MARCHAND considered that it would be helpful, in order to limit the discussion, to be quite clear that the point under discussion did not refer to signalling on open track but to signalling at junctions, and that it was important, in his opinion, to give the drivers an indication to remind them of the speed they must adhere to.

After a long discussion in which Mr. ELLIOT took part, the PRESIDENT put the question before the meeting.

— The majority of the delegates accepted the withdrawal of the two phrases which had given rise to difficulty.

M. CIRILLO (*Chemins de fer de l'Etat, Italie*) asked if the following sentence setting out information in regard to British signalling could not be shortened

— The majority of the delegates, however, were in favour of the retention of this paragraph.

M. DELACARTE suggested the deletion of the last two paragraphs of the summary, the factors dealt with in them not being appropriate for inclusion in the summary of a general character.

— The majority of the delegates were in favour of this suggestion.

— *Summary No. 2* was eventually adopted in the following form :

« 2. The majority of the railways use a system of speed signalling, some of them giving no indication of direction, whilst others combine with their speed signalling some indication of the route to be taken.

» Other railways, notably the British, do not have speed signalling, but use a system of four simple running aspects indicating danger, caution, preliminary caution and clear, with a direction indication at the home signal at a diverging junction. »

#### *Summary No. 3 :*

3. The majority opinion is that it is desirable for a driver to know at a junction whether the route which he should take is correctly set up. It is considered sufficient if an indication of a divergence is given at the junction home signal.

M. TENTI expressed the view that, on single track lines, it was dangerous to give an indication of the direction only at signals located close to the junction, since this indication might be too late to be of any value to the driver. He wished to add « on condition that the line is worked under lock and block. »

After further discussion in which Messrs. DYER, WILSON, WATKINS (*British Railways*) and MARCHAND took part, the following text was finally adopted :

« 3. The opinion of the majority is that it is desirable for a driver to know at a junction whether the route which he should take is correctly set up.

» It is considered, in general, sufficient that an indication of the direction should be given at the junction home signal. »

#### *Summary No. 4 :*

4. Although both the multi-lens type and the type of colour light signal with a moving vane with two or three coloured glasses are used to a considerable extent, it is generally considered that the advantage lies with the multi-lens type.

M. RIGHI drew attention to the different views put forward by the Administrations and asked whether one should not replace « is generally considered » by « the majority of Administrations consider ». »

*Summary No. 4* was then adopted in accordance with this proposal.

#### *Summary No. 5 :*

5. With regard to lamp bulbs, the single filament type is preferred as with two filaments, however close together they may be, they cannot both be at the focus of the optical system and the one out of focus gives a reduced visibility which cannot altogether be compensated by increased power. Also both filaments may be disconnected from the supply at the same instant or failure of the second filament may soon follow failure of the first.

— Adopted without modification.

#### *Summary No. 6 :*

6. It is desirable for the lights of controlled signals to be indicated in the signal

box and, at least for automatic signals, for the lamp in the red aspect to be proved alight before the next signal in rear can assume a proceed indication.

— Adopted without amendment.

*Summary No. 7 :*

7. There should be no confusion between red and yellow lights provided that the colours chosen are distinct and the lenses and glasses are obtained to a strict specification within close limits. No objection is therefore seen to the use of a single yellow aspect by itself or a single red aspect by itself.

— Adopted without alteration.

*Summary No. 8 :*

8. On lines equipped with an overhead electric traction system colour light signals should be used systematically though for economic reasons semaphore signals may be retained in some districts where the overhead traction equipment does not interfere too seriously with the view of such signals.

At the request of M. R. Lévi who thought that, having regard to the future of electric traction, it was undesirable to adopt rigorously colour light signalling, and the text should be slightly modified.

— *Summary No. 8* was eventually adopted on the basis of the following wording :

« 8. On lines electrified on the overhead system, it is preferable to adopt colour light signalling. Nevertheless, semaphore signalling can be retained so long as the electric traction equipment does not seriously impair the visibility of the signals. »

*Summary No. 9 :*

9. It is better from the point of view of locating and sighting the signals and to avoid

vibration of the light beam and damage to lamp filaments to fix the signals on separate posts rather than fix them to the catenary structures.

— Adopted without alteration.

*Summary No. 10 :*

10. Flashing lights are used by several countries but for different purposes.

— Adopted without modification.

Mr. DYER then dealt with the « General observations » of his report.

**General.**

*Summary No. 1 :*

1. With one or two exceptions the average number of breakdowns of all kinds in automatic signalling sections is less than one per signal per year. This is considered to be a remarkable result with the equipment concerned. The number of failures prejudicial to safety is practically negligible.

— Adopted without alteration.

2. Automatic signals may be passed at danger under two systems :

(a) only after receipt of a telephone authorisation from a signal box or station and

(b) under certain rules without telephone authorisation, the signals which may be so passed being indicated in some manner such as by a marker light or other sign.

The system requiring authorisation by telephone would seem to be the more desirable where this can be arranged.

M. MARCHAND considered that the system of giving authority by telephone to a driver to pass automatic signals in a « danger » position should be avoided whenever possible, and he suggested the deletion of the last sentence of the summary.

Lt. Col. WILSON and Mr. WATKINS put forward the opposite view, while M. MOULART considered that, on lines carrying a dense traffic, this system was unsuitable. After discussion, the PRESIDENT put M. MARSHAND's proposition to the vote and it was accepted.

— *Summary No. 2* was then adopted with this alteration.

The PRESIDENT closed the Session at 12.15 p.m. after having thanked Mr. DYER, and also the various delegates who had taken an active part in the discussions.

#### Meeting held on October 2nd 1950.

The meeting was opened at 9.15 a.m.

The PRESIDENT reminded the delegates that, before dealing with Question VIII it was necessary to conclude the discussion of *Summary No. 6* in Heading III of Question IX. The delegates concerned had agreed on a text, which was read out, and as no observations were made, *Summary No. 6* was finally accepted as follows :

« It is fairly general practice to lay down a minimum value of resistance for the track circuit test shunt below which it should never fall. A different minimum value is usually stipulated for different types of track circuit but except on a few of the railways the lowest figure is 0.15 ohm. It is considered that this value is rather lower than could be desired and consideration should be given to the best means of raising it in order to increase the safety factor. »

— The complete text of the Summaries adopted is the following :

## SUMMARIES.

### I. Remote control and operation of points and signals by means of relays.

« 1. Except in North America where special conditions obtain in that long lengths of line have been operated on the « Train Order » system, remote control of signalling by means of a coded relay system has not been used to a very large extent.

« 2. A number of other railways have, however, used the system to some extent and intend to extend the system as circumstances permit.

« 3. Remote control generally implies the use of automatic block signalling and this makes it possible to do away with present safety measures.

« 4. The system has been employed to increase the capacity of lines, to secure economies in operating or to bring about greater safety.

« 5. The financial results is generally decided by the cost of the coded relay equipment as against the cost of the number of controlling circuits needed for the required number of signalling functions over the distance involved.

« 6. No special maintenance arrangements have been found to be necessary and there has been no particular difficulty in obtaining suitable maintenance staff though special training is required.

## II. Electric power signalling installations. — Interlocked levers, relay interlocking, free push button or switch systems.

« 1. Though free push button and switch systems are being used to an increasing extent certain administrations consider that sufficient working experience has not yet been obtained to say whether such systems or the well-tried power signalling systems using miniature interlocked levers would be preferred.

« 2. The advantage of the free push button or switch system over levers individually interlocked is above all, of an operating character. Certain administrations are specially of this opinion when the system permits the automatic setting up and cancellation of routes.

« 3. It is not considered that greater technical knowledge is required on the part of the maintenance staff for maintaining free push button or switch systems than for interlocked lever systems but proper training of the staff is necessary owing to the much larger number of circuits and relays associated with push button and switch systems.

« 4. There is little difference in the overall prime cost of the different systems or in the cost of day to day maintenance. The number of relays requiring periodical overhaul, however, is greater in the case of the push button and switch systems.

« 5. It is considered that free push button or switch systems give rise to

« rather more serious and complicated problems for the traffic department in case of breakdown than with interlocked lever systems. This being so it is necessary to design the system so that a fault can be rectified quickly such as by the use of plug-in relays.

« 6. Opinions as to whether push buttons or switches should be fitted on a geographical panel or a separate desk panel are divided.

## III. Automatic signalling. Track circuits using permanent current or coded current.

« 1. Coded current track circuits are used fairly extensively in North America and to some extent in France and in new installations in Italy. Some experimental sections have been installed on a few railways and the system is under consideration by others.

« 2. Except where continuous cab signalling is being contemplated, the advantages claimed for the coded current system do not appear to compensate for the increased cost and complication, except in special cases.

« 3. There is full confidence in the correct operation of permanent current track circuits and coded current circuits both from the point of safety and regular operation.

« 4. It is not practicable to say what maximum length of track circuit is advisable as this depends upon several variable factors such as ballast conditions and type of rail fastenings.

« 5. The train shunt is governed by the maximum variation in the ballast

“ resistance and by the minimum value to which this falls. Under conditions of maximum ballast resistance the train shunt cannot be higher than the minimum value to which the ballast resistance falls. The train shunt is therefore not governed by the length of a track circuit alone. Consequently actual train shunts for track circuits of various lengths cannot be given as so much depends upon other factors.

“ 6. It is fairly general practice to lay down a minimum value of resistance for the track circuit test shunt below which it should never fall. A different minimum value is usually stipulated for different types of track circuit but except on a few of the railways the lowest figure is 0.15 ohm. It is considered that this value is rather lower than could be desired and consideration should be given to the best means of raising it in order to increase the safety factor.

#### IV. Light signalling. Signalling for direction and speed.

“ 1. The systems of light signalling used by the different railways vary so much and each railway, owing to the amount of signalling already in use, is so committed to its own system that it would not be practicable to adopt a uniform system for all railways even if a common system could be agreed upon.

“ 2. The majority of the railways use a system of speed signalling, some of them giving no indication of direction, whilst others combine with their speed

“ signalling some indication of the route to be taken.

“ Other railways, notably the British, do not have speed signalling, but use a system of four simple running aspects indicating danger, caution, preliminary caution and clear, with a direction indication at the home signal at a diverging junction.

“ 3. The opinion of the majority is that it is desirable for a driver to know at a junction whether the route which he should take is correctly set up.

“ It is considered, in general, sufficient that an indication of the direction should be given at the junction home signal.

“ 4. Although both the multi-lens type and the type of colour light signal with a moving vane with two or three coloured glasses are used to a considerable extent, it is considered, by the majority of administrations, that the advantage lies with the multi-lens type.

“ 5. With regard to lamp bulbs, the single filament type is preferred as with two filaments, however close together they may be, they cannot both be at the focus of the optical system and the one out of focus gives a reduced visibility which cannot altogether be compensated by increased power. Also both filaments may be disconnected from the supply at the same instant or failure of the second filament may soon follow failure of the first.

“ 6. It is desirable for the lights of controlled signals to be indicated in the signal box and, at least for automatic signals, for the lamp in the red aspect to be proved alight before the next signal in rear can assume a proceed indication.

“ 7. There should be no confusion between red and yellow lights provided that the colours chosen are distinct and the lenses and glasses are obtained to a strict specification within close limits. No objection is therefore seen to the use of a single yellow aspect by itself or a single red aspect by itself.

“ 8. On lines electrified on the overhead system, it is preferable to adopt colour light signalling. Nevertheless, semaphore signalling can be retained so long as the electric traction equipment does not seriously impair the visibility of the signals.

“ 9. It is better from the point of view of locating and sighting the signals and to avoid vibration of the light beam and damage to lamp filaments to fix the signals on separate posts rather than fix them to the catenary structures.

“ 10. Flashing lights are used by several countries but for different purposes.

### General.

“ 1. With one or two exceptions the average number of breakdowns of all kinds in automatic signalling sections is less than one per signal per year. This is considered to be a remarkable result with the equipment concerned. The number of failures prejudicial to safety is practically negligible.

“ 2. Automatic signals may be passed at danger under two systems:—

“ a) only after receipt of a telephone authorisation from a signal box or station, and

“ b) under certain rules without telephone authorisation, the signals which may be so passed being indicated in some manner such as by a marker light or other sign. ”

— The Plenary Meetings held respectively on September 29th. and October 4th. ratified these summaries.

## SECTION IV. — General.

*President* : Dr. D. J. WANSINK.

*Vice-Presidents* : Dr. SAYED ABDEL WAHID BEY and G. LINDENBERG.

*Principal Secretary* : H. LENFANT.

### QUESTION X.

Drawing up the financial balances regarding passenger and goods services taking into account the prime cost of trains: per category, per line and per type of motive power.

**Principles and methods of calculation.**

#### Preliminary documents.

Report (America (North and South), Burma, China, Denmark, Egypt, Finland, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States, Norway, Pakistan and Sweden), by ARNE SJÖBERG. (See *Bulletin* for April 1950, p. 447, or separate issue No. 11.)

Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, France and Colonies, Greece, Hungary, Italy, Luxembourg, Netherlands and Colonies, Poland, Portugal and Colonies, Rumania, Spain, Switzerland, Syria, Turkey and Yugoslavia), by R. DUGAS. (See *Bulletin* for June 1950, p. 1217, or separate issue No. 24.)

*Special Reporter* : ARNE SJÖBERG. (See *Bulletin*, October 1950, p. 2111.)

#### Report of Section IV.

(See *Daily Journal of the Session*, No. 2, p. 15 to 17; No. 5, p. 2.)

#### Meeting held on September 26th 1950.

The PRESIDENT then called on M. ARNE SJÖBERG, *Special Reporter*, to summarise the main parts of his Special Report.

The PRESIDENT, before opening the discussion, pointed out that there is a third accountancy method in use on the Dutch Railways, based on the principles of industrial book-keeping. This method enables a direct division of expenses reaching up to 83 %, 76 % if amortisations and financial charges are taken into account. He requested that a mention be made of this method.

M. DUGAS, *Reporter*, agreed that he had made too brief a summary in his report of the Dutch Railways method. He gave additional information on the accountancy method, pointing out that this should not, in any case, be misleading as regards financial realities.

M. GIRETTE (*Société Nationale des Chemins de fer français*) and Mr. HARRISON (*British Railways*) put a few questions, to which the PRESIDENT replied.

Mr. SHERRINGTON (*British Railways*) also raised three questions of principle.

M. SJÖBERG summarised the questions by explaining that there are in fact only three variations of the one and same method.

M. LALONI (*Chemins de fer de l'Etat, Italie*) also took part in the discussion. In his view, the methods limit themselves to an accountancy method and an indirect method.

The PRESIDENT thanked the Delegates for their interesting remarks, and proceeded with the examination of the Summaries of the Special Report.

#### *Summary No. 1 :*

1. The use of an efficient system of cost finding is still very limited among the railways and often merely in an experimental stage.

— Adopted.

#### *Summary No. 2 :*

2. From the experience already acquired by different railways it can be concluded that in the present railway economic situation a workable cost finding system including among other things calculations of marginal and average costs of trains per category, per line and per type of motive power and of financial balances regarding passenger and goods services and different regions of a railway system must be considered to be of fundamental importance in attaining efficient and financially sound railway enterprises.

After an exchange of views between Messrs. DUGAS, LALONI, GIRETTE, and at Mr. MILES BEEVOR's suggestion, the text was slightly amended and *Summary No. 2* was adopted as shown hereafter.

#### *Summary No. 3 :*

3. In broad outline two different systems of cost finding can be distinguished, « the accounting method » and « the alternative budget method ».

The accounting method is primarily based on an analysis of the expenses of a past year, while the alternative budget method

involves an estimation of the development of future expenses and revenues.

However one can distinguish different lines of development as regards the accounting method. At one extreme a very schematic cost division between a few service branches and at the other a very detailed accounting analysis of the costs of different categories of trains, traffics, etc. According to the latter very complete variant of the accounting method the calculated costs of the base-year, when applied to future time periods, are readjusted to take into account modifications in the economic conditions, in the traffic characteristics, etc.

In its most advanced form the accounting method, as applied e.g. in France and in Belgium, will therefore give the same results as the alternative budget method.

M. DUGAS proposed that the third paragraph be amended as follows :

« ...a very detailed accounting analysis, at the same time statistical, of the costs of different categories of trains, traffics, etc. »

The PRESIDENT also asked that mention be made of the method adopted on the Dutch Railways.

— A discussion took place between Messrs. SJÖBERG and GIRETTE, resulting in the adoption of the *new text of Summary No. 3*, as follows :

« 3. In broad outline, two different systems of cost finding can be distinguished, « the accounting method » and « the alternative budget method ». A special variation of these two systems of cost finding is the method of standard costs applied, for example, by the Dutch Railways.

« The accounting method is primarily based on an analysis of the expenses of a past year, while the alternative budget method involves an estimation of the

development of future expenses and revenues.

« However, one can distinguish different lines of development as regards the accounting method. At one extreme a very schematic cost division between a few service branches and at the other a very detailed accounting analysis, at the same time statistical, of the costs of different categories of trains, traffics, etc. According to the latter very complete variant of the accounting method, the calculated costs of the base-year, when applied to future time periods, are readjusted to take into account modifications in the economic conditions, in the traffic characteristics, etc.

« In its most advanced form the accounting method, as applied, i.e. in France and in Belgium, will therefore give the same results as the alternative budget method. »

— Adopted.

#### *Summary No. 4 :*

4. A general system of cost finding comprises as a basic element calculations of average and marginal costs of different operating services (cost of trains per category, per line and per type of motive power, etc.) and of the various categories of traffic services (costs per passenger carried, per ton forwarded, costs per passenger-kilometre, per ton-kilometre, etc.). With these costs as a basis one can form e.g. the financial balances (profit and loss statements regarding passenger and goods services), which are the main interest of this report.

M. LALONI asked that the word « interest » at the end of the last sentence, be replaced by « object ».

— *Summary No. 4* was adopted with this alteration.

#### *Summary No. 5 :*

5. Profit and loss statements of passenger and goods services are indispensable for attaining a rational business policy of the railway enterprise as regards the general level of fares and rates of these two principle classes of traffic. For fixing the individual fares and rates within passenger respectively goods traffic, however, one has to know the appropriate average and marginal costs of traffic.

Mr. DAVID BLEE (*British Railways*) proposed to replace the word « indispensable » by « valuable » in the first sentence, and this was adopted.

M. DUGAS was not satisfied with the wording of the second sentence which does not agree with the first. The Section adopted a new text as follows for *Summary No. 5* :

« 5. Profit and loss statements of passenger and goods services are valuable for attaining a rational business policy of the railways enterprise as regards the general level of fares and rates of these two principal classes of traffic. Moreover, the knowledge of average costings, and of appropriate marginal costs, may enable determination of particular rates and fares applicable either to certain passenger traffics or to certain goods traffics. »

#### *Summary No. 6 :*

6. Profit and loss statements of different classes of traffic are used for establishing « full cost »- prices, which the railways often apply to postal and military transports, where the payments according to government's order must be fixed on a « cost of service »-basis.

In establishing profit and loss statements of this kind all costs — even the common and constant costs — must be separated between the different classes of traffic.

The PRESIDENT criticised the second paragraph, pointing out that the division of expenses is not always possible. He proposed to cancel it.

M. DUGAS thought that it should be allowed to remain and quoted the case of important traffics (military traffics, for example) for which it is necessary to invoice permanent way expenses if the budget is to be balanced.

Messrs. SJÖBERG and DUGAS proposed the following new text for the 2nd paragraph :

« In establishing profit and loss statements of this kind, it is necessary to separate even the common and constant costs according to some agreed method between the different classes of traffic. »

— *Summary No. 6* was adopted with this modification.

#### *Summary No. 7 :*

7. Profit and loss statements may be prepared for a line or a group of lines of a railway system. Statements of this kind have been established by various railways, particularly for secondary lines.

Such statements, that often will be rather arbitrary and conventional as regards calculation methods, are nevertheless of great practical value as a measure of the relative profitability of different lines of a railway system. Particularly for economically weak lines these statements fulfil an important task in the restraining of business-economically unauthorized claims from different « pressure groups » as regards rates and fares, frequency of trains, etc., on these weak lines.

Statements of different lines, when put together for a sequence of years, are also of great importance in judging the development of expenses and revenues of the different lines and can thus serve as a useful guide in the work of controlling and increasing the efficiency of the enterprise.

Mr. HARRISON (*British Railways*) proposed an amendment to the English wording of the second sentence of the second paragraph.

Messrs. SJÖBERG and DUGAS agreed, and proposed to amend the French text, which was adopted, in the following form :

« 7. Profit and loss statements may be prepared for a line or a group of lines of a railway system. Statements of this kind have been established by various railways, particularly for secondary lines.

« Such statements, that often will be rather arbitrary and conventional as regards calculation methods are nevertheless of great practical value as a measure of the relative profitability of different lines of a railway system. Particularly for economically weak lines these statements fulfil an important task in meeting, within reasonable limits, the claims of certain interested parties likely to exercise pressure. »

#### *Summary No. 8 :*

8. As a comprehension of the above may be established that the railways nowadays more than before must have at their disposal reliable and sufficiently detailed data about costs and revenues of different products, classes of traffic, lines or regions of the railway system, etc., in order to be able to perform an economically rational business policy as regards price-fixing and other forms of sale policy, choice of productive resources, production organisation and management efficiency control of selling and production activities.

Mr. MILES BEEVOR (*British Railways*) pointed out that this paragraph repeats previous paragraphs, particularly 2, 4

and 5, and he proposed its deletion, which was adopted unanimously.

— *Summary No. 8* was cancelled.

*Summary No. 9  
(becoming Summary No. 8):*

9. In developing a national transportation policy by the Government and its different agencies, where the most important problem will be to create an economically rational coordination between the different means of transport, railways, highways, waterways and airways, it is necessary to have adequate knowledge of the comparative costs of performing different transportation services, by each of these means of transport.

It is therefore desirable that cost calculations and profit and loss statements (financial balances) of the same general character as those recommended above for the railways also are introduced for highways, waterways and airways. As to these latter means of transport it is particularly important to have the costs of the permanent way and the terminal facilities clearly and distinctly accounted.

M. LALONI proposed to simplify the text by amending the end of the first paragraph.

— *Summary No. 8* (former No. 9) was adopted with a wording slightly altered.

— The agenda being exhausted, the PRESIDENT thanked particularly the Reporters and the Special Reporter and stated that the following Summaries were adopted :

### SUMMARIES.

“ 1. The use of an efficient system of cost finding is still very limited among the railways and often merely in an experimental stage.

“ 2. From the experience already

“ acquired by different railways, it can be concluded that in the present railway economic situation a workable cost finding system including among other things calculations of marginal and average costs of trains per category, per type of motive power, and of financial balances regarding passenger and goods services and different lines of a railway system must be considered to be of fundamental importance for efficient railway management.

“ 3. In broad outline, two different systems of cost finding can be distinguished, “ the accounting method ” and “ the alternative budget method ”. A special variation of these two systems of cost finding is the method of standard costs applied, for example, by the Dutch Railways.

“ The accounting method is primarily based on an analysis of the expenses of a past year, while the alternative budget method involves an estimation of the development of future expenses and revenues. However, one can distinguish different lines of development as regards the accounting method. At one extreme a very schematic cost division between a few service branches and at the other a very detailed accounting analysis, at the same time statistical, of the costs of different categories of trains, traffics, etc.

“ According to the latter very complete variant of the accounting method, the calculated costs of the base-year, when applied to future time periods, are readjusted to take into account

« modifications in the economic conditions, in the traffic characteristics, etc.

« In its most advanced form the accounting method, as applied, i.e. in France and in Belgium, will therefore give the same results as the alternative budget method.

« 4. A general system of cost finding comprises as a basic element calculations of average and marginal costs of different operating services (cost of trains per category, per line and per type of motive power, etc.) and of the various categories of traffic services (costs per passenger carried, per ton forwarded, costs per passenger-kilometre, per ton-kilometre, etc.). With these costs as a basis one can form e. g. the financial balances (profit and loss statements regarding passenger and goods services), which are the main object of this report.

« 5. Profit and loss statements of passenger and goods services are valuable for attaining a rational business policy of the railway enterprise as regards the general level of fares and rates of these two principal classes of traffic. Moreover, the knowledge of average costings, and of appropriate marginal costs, may enable determination of particular rates and fares applicable either to certain passenger traffics or to certain goods traffics.

« 6. Profit and loss statements of different classes of traffic are used for establishing « full cost » prices, which the railways often apply to postal and military transports, where the payments according to government's order

« must be fixed on a « cost of service » basis.

« In establishing profit and loss statements of this kind, it is necessary to separate even the common and constant costs according to some agreed method between the different classes of traffic.

« 7. Profit and loss statements may be prepared for a line or a group of lines of a railway system. Statements of this kind have been established by various railways, particularly for secondary lines.

« Such statements, that often will be rather arbitrary and conventional as regards calculation methods are nevertheless of great practical value as a measure of the relative profitability of different lines of a railway system. Particularly for economically weak lines these statements fulfil an important task in meeting, within reasonable limits, the claims of certain interested parties likely to exercise pressure.

« 8. In developing a national transportation policy by the Government and its different agencies, where the most important problem will be to create an economically rational coordination between the different means of transport, railways, highways, waterways and airways, it is necessary to have an adequate knowledge of the comparative costs of transport by each of these different means.

« It is therefore desirable that cost calculations and profit and loss statements (financial balances) of the same

« general character as those recommended above for the railways, are also introduced for highways, waterways, and airways. As to these latter means of transport it is particularly important to have the costs of the permanent way and the terminal facilities clearly and distinctly accounted. »

— The Plenary Meeting held on September 29th ratified these Summaries.

#### QUESTION XI.

##### **Organisation and development of medical and social services with partnership of the staff in their management.**

###### **Preliminary documents.**

Report (Great Britain and North Ireland, Dominions, Protectorates and Colonies, America (North and South), China, Burma, Egypt, India, Pakistan, Malay States, Iraq and Iran), by P. H. SARMA. (See *Bulletin* for May 1950, p. 841, or separate issue No. 17.)

Report (Austria, Belgium and Colony, Denmark, Spain, Finland, France and Colonies, Greece, Hungary, Italy, Luxembourg, Norway, Netherlands and Colonies, Portugal and Colonies, Sweden, Switzerland, Syria and Turkey), by Dr. A. HUYBERECHTS. (See *Bulletin* for June 1950, p. 1255, or separate issue No. 26.)

*Special Reporters* : Dr. A. HUYBERECHTS and A. HUYS. (See *Bulletin*, October 1950, p. 2115.)

###### **Report of Section IV.**

(See *Daily Journal of the Session*, No. 3, pp. 11/12; No. 4, pp. 7/8; No. 5, p. 2.)

##### **Meeting held on September 27th 1950.**

— The Meeting opened under the Presidency of Dr. SAYED ABDEL WAHID BEY, Vice-President, as Dr. D. J. WANSINK was unable to attend this session.

At the opening of the debate, various remarks of a general nature were made by Dr. DI LULLO (*Italian State Railways*), followed by M. ESTEVES (*Portuguese Railways*). Dr. DI LULLO explained the medical organisation of the Italian State Railways, certain features of which remained obscure or incomplete in the general report.

M. ESTEVES considered that the problem had been put forward wrongly and, in his opinion, a line should be drawn between the medical service, without any partnership of the staff, and the social services, with which the staff may be associated. He voiced certain apprehensions regarding the effect on discipline.

M. ITTEN (*Swiss Federal Railways*) pointed out that there was an error in the text of the Swiss reply published in the *Bulletin* of the Congress of May 1950 (page 889, French edition), which he would like to see rectified.

Dr. HUYBERECHTS summarised the discussion by pointing out that, in his view, the intervention of the staff did not affect, in any way, purely medical questions and, therefore, that discipline could not suffer therefrom. He explained, in particular, the rules governing the recruitment of medical personnel, and pointed out that in this case the interest of the staff should be limited to seeing that these rules are applied.

Mr. THORNEYCROFT (*Ministry of Transport, Great Britain*) expressed the British point of view and his disagreement with the opinion of Dr. ESTEVES. He stressed the efforts made by the British Transport Commission to obtain, in this field, the collaboration of the staff at all levels.

M. BERTRAND (*Société Nationale des Chemins de fer français*) presented the French point of view, pointing out that on the French Railways the medical and social services are separate in practice and are only linked together at managerial level.

A discussion then ensued regarding the « Commission Paritaire » (Belgian and French equivalent to the Joint Consultative Staff Council) which caused the intervention of various delegates and furnished M. ESTEVES with a further opportunity of stressing his point of view.

M. JAMET (*Régie Autonome des Transports parisiens, France*) concluded this part of the debate by stressing that there are, in fact, two problems, the Medical and the Social, and that the discussion tended to show that the staff should only be called upon to participate in the latter.

The PRESIDENT then proposed, after a final intervention by M. NOLET DE BRAUWERE (*Société Nationale des Chemins de fer belges*), in order to meet the wishes of the majority of the delegates, to adopt for Question XI the following title :

« *Organisation and development of medical and social services with partnership of the staff in their management.* »

The Section agreed with this proposal,

subject to further discussion concerning the word « *gestion* » appearing in the French title. Examination and discussion of the Summaries then followed.

*Summary No. 1 :*

1. When the legislation of the country does not make it impossible, it is advantageous for the railway Administrations to organise their own medical-social services.

Dr. HUYBERECHTS pointed out that the object of this Summary is simply to record the fact that, on the whole, the institution of medical and social services on the railways is desired by the staff.

M. FLAMENT (*Société Nationale des Chemins de fer français*) approved and suggested that the position taken on this matter be clarified by adding a few words to the proposed text.

M. GORDTS (*Ministère des Communications, Belgique*) asked that Summary No. 3 be combined with Summary No. 1. The Section agreed with the proposals of Messrs. FLAMENT and GORDTS and adopted the following text :

« 1. When the legislation of the country does not make it impossible, it is advantageous for the Railway Administrations to organise their own medical and social services in order to meet the pressing requirements of railway traffic as well as the particular conditions of the work and welfare of their staff.

« Moreover, when a country's medical services are inadequate or non-existent, the Administration concerned should itself organise such services for its employees and their families. »

**Summary No. 2 :**

2. Where there is complete or limited autonomy, of the medical-social services, it is advantageous to let the staff share in the management of these services; at the same time as they take over part of the authority, they will assume a corresponding part of the responsibility.

Dr. HUYBERECHTS commented on the proposed text, stressing its flexibility, bearing in mind the different degrees of evolution and maturity of the personnel in the various countries. The text gave rise to a protracted discussion, in which Messrs. FLAMENT and ESTEVES, Dr. BAZY (*Société Nationale des Chemins de fer français*), Mr. SANDERSON (*Malayan Railways*), Dr. CAVENDISH FULLER (*British Railways*) and Mr. ALLEN (*British Railways*) took part. Dr. BAZY, in particular, explained the doctor's point of view and claimed for them absolute independence on all questions purely medical. Various texts, in succession, were suggested, discussed and rejected. Finally, Dr. HUYBERECHTS read out a new wording which, in view of the late hour, will serve as a basis for discussion at the next meeting.

**Proposal of Dr. HUYBERECHTS :**

« 2. Where there is complete or limited autonomy of the medical and social services, vis-a-vis the legal regime, it is advantageous to let the staff share in the management of services providing social benefits. This share of responsibility and authority would be justified according to the extent of their personal and financial contributions. It should, however, be understood that this share of authority will not be allowed to interfere with the medical activities themselves. »

— The meeting ended at 12 noon.

**Meeting held on the 28th September 1950.**

The meeting opened at 9.15 a.m., Dr. WANSINK taking the chair, and the debate developed at once on the text proposed by Dr. HUYBERECHTS given at the end of the report of the meeting of the 27th September. M. GOURSAT (*Société Nationale des Chemins de fer français*) proposed to add the word « general » to « legal regime » and to complete the first sentence as follows :

“ as far as is permitted by the regulations governing in each country the medical and social activities on the railways. »

M. ESTEVES confirmed his previous contention that the staff have no connection with this problem.

Dr. HUYBERECHTS agreed with the wording as proposed by M. GOURSAT, whereas Mr. ALLEN (*British Railways*), in view of the difficulty in reaching agreement, proposed to revert to the initial text of Dr. HUYBERECHTS which, he thought, was the more likely to express the general opinion on this question. The PRESIDENT then put the two proposals to a vote, and finally the text presented by Dr. HUYBERECHTS and amended by M. GOURSAT, was adopted by 25 votes against 11.

« 2. Where there is complete or limited autonomy of the medical and social services vis-à-vis the general legal regime, it is advantageous to let the staff share in the management of services providing social benefits, as far as is permitted by the regulations governing in each country the medical and social activities on the railways. »

*Summary No. 3 :*

3. When a country's medical services are inadequate or non-existent, the Administration concerned should itself organise such services for its employees and their families.

This summary was combined with *Summary No. 1* during the meeting of 27th September and is therefore cancelled.

*Summary No. 4*

(*new Summary No. 3*) :

4. Social services in particular should be organised on solidarity and equality lines. It is desirable that this idea should oust the idea of « assistance ».

A short discussion arose between Mr. LINDENBERG (*South African Railways*), Mr. ALLEN and Dr. HUYBERECHTS on the English wording of the text, particularly on the meaning of « solidarity and equality lines ». Mr. ALLEN proposed the following text, which was adopted :

« 3. Social services in particular should be based on the concept of solidarity and mutual assistance. »

*Summary No. 5*

(*new Summary No. 4*) :

5. It is desirable that in every field where it is practicable, contacts and exchanges shall be organised between the employees of the different railway Administrations. Where they are already in existence (in the medical field : International Union of Railway Medical Services; in the world of sports : International Railwaymen's Sporting Union; in the tourist field : International Federation of Railwaymen's Tourist Associations); such contacts and exchanges should be extended and developed, to include those Administrations which so far have not taken part in them.

Dr. HUYBERECHTS proposed to include

a sentence on additional free travel facilities to be granted by Railway Administrations in order to promote various social activities.

Mr. ALLEN would like to add « as far as possible » after « such contacts and exchanges should be extended and developed ». M. DE BRUYN (*Netherlands Railways*) agreed with Dr. HUYBERECHTS' proposal, but rejected Mr. ALLEN. After the intervention of Mr. SANDERSON (*Malayan Railways*), Mr. ALLEN and Dr. WANSINK, the question was put to a vote, and the *original text finally adopted*.

*Summary No. 6*

(*new Summary No. 5*) :

6. Railway Administrations would find it of value to organise professional instruction, on the one hand, for the children of employees, who wish to follow the same career as their parents, and on the other hand, for employees themselves to enable them to perfect their knowledge of their profession and qualify for higher and better paid posts.

It is desirable that contacts and exchanges between railway Administrations, already recommended in other connections, should also take place in the field of professional education.

M. NOLET DE BRAUWERE (*Société Nationale des Chemins de fer belges*) stressed the interest of the human and psychological factor in the training of supervisory staff (gang foremen, etc.) and a discussion ensued on this subject between Messrs. NOLET DE BRAUWERE and DE BRUYNE. The delegates agreed on the interest of the problem raised by M. NOLET DE BRAUWERE, which could be examined at a subsequent session.

M. BERTRAND adhered to the wording of the Summary as proposed, but sug-

gested the deletion of the words « ...and better paid... ». Dr. HUYBERECHTS supported M. BERTRAND's proposal, and suggested that the final paragraph be completed to read :

« ...in the field of professional education and improvement. »

M. LINDBERG criticised the first paragraph of the Summary under discussion, and proposed to substitute the following new text :

« Railway Administrations would find it of value to organize instructional classes for employees to enable their qualifying for higher posts. »

An exchange of views took place between Messrs. ALLEN, BOSC (*Chemins de fer de l'Afrique Occidentale Française et Togo*) and BERTRAND on the advisability of giving clear indications in the text of the people entitled to attend the professional courses (railwaymen's sons and present employees).

The PRESIDENT summarised the whole question at that stage, and Dr. HUYBERECHTS said that he would agree to M. LINDBERG's proposal with a view to obtaining unanimity.

H. E. Dr. SAYED ABDEL WAHID BEY then proposed an amendment to M. LINDBERG's text, worded as follows :

« ...and to give the children of the staff exceptional facilities in following courses of apprenticeship. »

The PRESIDENT then decided to vote on the three texts proposed by :

- 1) M. LINDBERG.
- 2) M. LINDBERG with amendment by H. E. Dr. SAYED ABDEL WAHID BEY.

3) the Special Reporter.

The wording submitted by M. LINDBERG was finally adopted by a substantial majority :

« 5. Railway Administrations would find it of value to organise instructional classes for employees to enable their qualifying for higher posts.

« It is desirable that contacts and exchanges between Railway Administrations, already recommended in other connections, should also take place in the field of professional education and improvement. »

The PRESIDENT stated that the following Summaries were adopted :

### SUMMARIES.

« 1. When the legislation of the country does not make it impossible, it is advantageous for the Railway Administrations to organise their own medical and social services in order to meet the pressing requirements of railway traffic as well as the particular conditions of the work and welfare of their staff.

« Moreover, when a country's medical services are inadequate or non-existent, the Administration concerned should itself organise such services for its employees and their families.

« 2. Where there is complete or limited autonomy of the medical and social services vis-à-vis the general legal regime, it is advantageous to let the staff share in the management of services providing social benefits, as far as is permitted by the regulations governing in each country the medical and social activities on the railways.

“ 3. Social services in particular should be based on the concept of solidarity and mutual assistance.

“ 4. It is desirable that in every field where it is practicable, contacts and exchanges shall be organised between the employees of the different Railway Administrations. Where they are already in existence (in the medical field: International Union of Railway Medical Services; in the world of sport: International Railwaysmen's Sporting Union; in the tourist field: International Federation of Railwaymen's Tourist Associations), such contacts and exchanges should be extended and developed, to include those Administrations which so far have not taken part in them.

“ 5. Railway Administrations would find it of value to organise instructional classes for employees to enable their qualifying for higher posts.

“ It is desirable that contacts and exchanges between Railway Administrations, already recommended in other connections, should also take place in the field of professional education and improvement.

— These Summaries were ratified by the Plenary Meeting held on September 29th 1950.

#### QUESTION XII.

**What must the importance and the prevailing conditions of traffic be, in order that from the economic point of view:**  
**a) the construction of a railway line;**  
**b) the keeping operating an existing railway line;**  
**should be useful ?**

#### Preliminary documents.

Report (Great Britain, North Ireland, Dominions, Protectorates and Colonies, America (North and South), China, Burma, Costa-Rica, Egypt, India, Malayan States, Pakistan, Iraq, Iran), by SVEN BOYE. (See *Bulletin* for February 1950, p. 111, or separate issue No.1.)

Report (Austria, Belgium and Colony, Bulgaria, Czechoslovakia, France and Colonies, Greece, Hungary, Italy, Luxembourg, Netherlands and Colonies, Poland, Portugal and Colonies, Rumania, Spain, Switzerland, Syria and Yougoslavia), by N. LALONI. (See *Bulletin* for June 1950, p. 1371, or separate issue No. 27.)

Supplement to Report, by SVEN BOYE. (See *Bulletin*, July 1950, p. 1471.)

*Special Reporter* : N. LALONI. (See *Bulletin*, October 1950, p. 2119.)

#### Report of Section IV.

(See *Daily Journal of the Session*, No. 6, pp. 11/12; No. 7, p. 4 to 6; No. 8, p. 1.)

#### Meeting held on October 2nd 1950.

The meeting opened at 9.30 a.m., under the chairmanship of Dr. WANSINK, who immediately started the discussion on the general aspects of the question by inviting M. ESTEVES (*Compagnie des Chemins de fer portugais*) to speak.

M. ESTEVES first examined point a) of the question, and stated that the problem of the building of new lines by a system does not arise from an economical point of view, except, perhaps, for colonial systems; however, if new lines are to be

built, the intervention of the State, acting in the general interest, would be necessary. With regard to point *b*), M. ESTEVES asked that the keeping in operation of a non-profitable line and its replacement by a road service run by the Railway Administration resulted from a Governmental decision : in the event of maintenance of rail operation, the State should bear the deficit. M. ESTEVES proposed to replace the 10 Summaries of the Special Report by two conclusions drafted on the above lines.

D. DUGAS (*Société Nationale des Chemins de fer français*) pointed out that the report appeared to be based on the assumption that there are deficit-showing lines and lines showing a profit, which cannot always be verified. In addition, what are deficit-showing lines ? Are they lines which do not cover their total cost, or only lines which do not cover their direct expenses ?

Mr. PICKFORD (*British Railways*) suggested to revert to the end of the Summaries the various considerations developed by M. ESTEVES on State intervention.

M. BOSC (*Chemins de fer de l'Afrique Occidentale française*) explained the position in this matter of the colonial systems and was looking forward to more precise conclusions based on the experience of the large systems.

Mr. MILES BEEVOR (*British Railways*) gave a summary of the conditions prevailing in Great Britain, and shewed how the problem was solved by the integration of the various modes of transport.

M. SANTORO (*Chemins de fer de l'Etat, Italie*) advised great care in the matter of closing lines, and emphasised the danger if the railways tied themselves to strict rules. In any circumstances, State intervention should be well apparent in the eyes of the public.

Mr. SHERRINGTON (*British Railways*) pointed out that in a survey of the volume of traffic justifying the closing of a line, the existence of subsidies which may be granted by the State should be borne in mind.

M. SJÖBERG (*Swedish State Railways*) insisted on the difficulty of working out a precise method of analysis of the results of a line, and shewed that the problem is linked with that of Question X.

Mr. MANITTO-TORRES (*Benguela Railways*) paid a tribute to the important work of M. LALONI, *Special Reporter*, and approved the Summaries of the special report, pointing out, however, that they are, on the whole, statements of facts, instead of actual conclusions. According to Mr. MANITTO-TORRES, the salient point was that relating to the abandonment of deficit-showing lines; this closing of lines should only be admitted as a last resort, and the operation of the road replacement service should be undertaken by the railway, who would keep the rights of rail operation in view of a possible re-opening of railway lines in the future.

Mr. MANITTO-TORRES then proposed a new Summary No. 8 on the above lines.

M. COTTIER (*Office Central des Trans-*

*ports internationaux par Chemins de fer)* would have preferred that the Questionnaire had also been submitted to the various Ministries of Transport : he made a comparison between the largest systems, who could make a compensation between the output of their lines, and the smaller systems where this is not possible, and he gave some information on the Swiss legislation in the matter of subsidies.

The PRESIDENT then summarised the debates and M. LALONI replied briefly to each Delegate who took part in the discussion. M. ESTEVES' proposal was put to a vote, and rejected by a substantial majority, but it was to be understood that any necessary amendments could be put forward during examination of *Summaries Nos. 1 to 10* of the Special Report.

The PRESIDENT opened the discussion on the Summaries.

#### *Summary No. 1 :*

M. DEN HOLLANDER (*Netherlands Railways*) expressed surprise to see the debates extending on the question of deficit-showing lines when it had been acknowledged that no precise means had yet been devised to determine with accuracy what these lines were.

Mr. PICKFORD and M. ÜPMARK (*Swedish State Railways*) proposed some alteration in the layout of *Summaries Nos. 1 and 2*.

The PRESIDENT, referring to these remarks, put the question as to whether, as *Summary No. 1*, a wish should not be

recommended in regard to the rendering by the Railway Administrations of profit and loss accounts per line.

M. ÜPMARK replied that it would suffice to keep these accounts for the worst lines.

Mr. HARRINGTON (*British Railways*) explained that in Great Britain there is, for each Region, a Committee surveying the non-profitable lines and reporting to Headquarters on the advisability of closing certain rail services. Messrs HARRINGTON and MILES BEEVOR proposed that mention be made in the text of this organisation.

M. BERTRAND (*Société Nationale des Chemins de fer français*) summarised the discussion by pointing out that all Delegates agreed that the Summaries of the Special Report are factual statements which could be studied by a small Committee to enable them to draw up the actual conclusions.

The PRESIDENT and M. LALONI agreed with this procedure and requested the Delegates to form such a Committee.

M. LALONI apologised for his inability to sit on this Committee, and asked M. SANTORO to replace him.

The absence at this moment of M. ESTEVES was deeply regretted when this Committee was formed by Messrs. DUGAS (*France*), HARRINGTON (*Great Britain*), SANTORO (*Italy*) and SJÖBERG (*Sweden*).

The Committee have proposed the following texts of the Summaries to be discussed at the meeting of 3rd October.

*Summary No. 1 :*

For different areas there are variations in regard to railway operation and maintenance, periodic traffic fluctuations, transport organisation and economic conditions. It is therefore in general not possible to state :

- a) the volume of traffic for which a new line should be built;
- b) the volume of traffic below which operation of an existing line should be discontinued.

*Summary No. 2 :*

Each case must therefore be considered on its merits.

*Summary No. 3 :*

For these investigations the railway must be able to assemble reliable and sufficiently detailed data of receipts and expenditure for each prospective new line and for each existing line of doubtful value.

*Summary No. 4 :*

In the interpretation of the data so compiled attention must necessarily be directed to the following factors :

- a) the relation of the line to the traffic generally of the region and its contributory value as a feeder to the main line;
- b) the relationship between the railway and road service;
- c) the simple consideration that traffic density compels the railway in some instances to construct new lines. The existing rates and charges scales in the majority of countries have been based

in relation to costs of construction substantially less than those applicable today. Adjustments of the general level of charges must have regard to this point.

**Meeting held on October 3rd 1950.**

The meeting opened at 9.30 a.m. under the chairmanship of Dr. WANSINK.

The proposed Summaries framed by the Committee at the end of the previous meeting were read out. The PRESIDENT commented on these Summaries, stressing that the economic viewpoint inspired their wording.

The PRESIDENT suggested replacement of point c) of *Summary No. 4* by a *Summary No. 5* in view of the special character of the question dealt with.

M. LALONI, *Special Reporter*, made a few remarks on the new Summaries submitted, and wished that these Summaries, which he accepted in principle, should be presented as a result of the statement of facts which ended his Special Report.

The PRESIDENT agreed on this point, which conforms with the general procedure of the Congress.

M. DEN HOLLANDER was in favour of maintaining the 10 points of the Special Report, and of adding the new Summaries as an appendix.

M. DUGAS paid tribute to M. LALONI's work and confirmed that the insufficiency of the replies received induced the Special Reporter to summarise factual statements instead of framing actual Summaries. The object of the Committee had

been to frame Summaries from points 1 to 10 of the Special Report.

The PRESIDENT then requested the Delegates to limit the debate to an examination of the new Summaries, the statement of facts set out under 1 to 10 of the report not being open to discussion.

Mr. HARRINGTON proposed the text of a preamble to link the statements of the special report to the new Summaries.

— After discussion between Messrs. FARQUHARSON (*East African Railways*), LALONI, SVEN BOYE, PANICELLI (*Italian State Railways*), COTTIER, the following text of the preamble was adopted :

#### *Preamble.*

“ After examining the Summary of the replies prepared by the Special Reporter and the statement of facts obtained by the Special Reporter, the Summaries which follow have been framed solely from the view of economic railway administration, omitting consideration of other aspects. ”

The Meeting then proceeded with the examination of the Summaries.

#### *Summary No. 1 :*

1. For different areas there are variations in regard to railway operation and maintenance, periodic traffic fluctuations, transport organisation and economic conditions. It is therefore in general not possible to state :

(a) the volume of traffic for which a new line should be built;

(a) the volume of traffic below which operation of an existing line should be discontinued.

Mr. PICKFORD proposed to add after “ volume of traffic », the words “ nature and revenue prospects ».

An exchange of views took place on this between Messrs. SJÖBERG, MILES BEEVOR and COTTIER. Mr. PICKFORD’s proposal was rejected after a vote, and *Summary No. 1* was adopted with a slight amendment in the French wording suggested by M. DUGAS.

#### *Summary No. 2 :*

2. Each case must therefore be considered on its merits.

M. LALONI requested clarification of the wording of this Summary, and proposed the following text :

“ 2. Each case of building a new line or continued operation of an existing line must therefore be considered on its merits. ”

— Adopted.

#### *Summary No. 3 :*

3. For these investigations the railway must be able to assemble reliable and sufficiently detailed data of receipts and expenditure for each prospective new line and for each existing line of doubtful value.

After an intervention by Messrs. LALONI, ÜPMARK, LINDBERG and COTTIER, slight adjustments were made to the text, which was finally adopted in the following form :

“ 3. For these investigations each railway system ought to be able to assemble reliable and sufficiently detailed data of receipts and expenditure for each prospective new line and for each existing line of doubtful value. ”

*Summary No. 4 :*

4. In the interpretation of the data so compiled attention must necessarily be directed to the following factors:

(a) the relation of the line to the traffic generally of the region and its contributory value as a feeder to the main line;

(b) the relationship between the railway and road service;

M. DUGAS made some adjustment in the French text. A discussion then followed on the interpretation of paragraph b).

What sort of relationships were meant?

Messrs. MILES BEEVOR, ÜPMARK, COTTIER and DUGAS gave their views, and various wordings of this point were proposed.

The Meeting, confronted with various texts, decided on that framed by the Committee, and amended by Messrs. ÜPMARK and MILES BEEVOR.

*Summary No. 4 was then adopted as follows :*

« 4. In the interpretation of the data so compiled, and in the formulation of a sound commercial judgment of the future position, attention must necessarily be directed to the following factors :

« a) the relation of the line to the general traffic of the region and its contributory value as a feeder to the main line;

« b) the conditions of competition or co-operation with the other means of transport. »

*Summary No. 5 :*

5. The simple consideration that traffic density compels the railway in some

instances to construct new lines. The existing rates and charges scales in the majority of countries have been based in relation to costs of construction substantially less than those applicable today. Adjustments of the general level of charges must have regard to this point.

M. LALONI pointed out that by cutting the first sentence of this Summary from the previous one, its meaning would not be very clear.

M. DUGAS suggested a new wording of the French text. The PRESIDENT then clarified the object of this Summary : the necessity of constructing new lines by reason of traffic density and of covering expenses by an adjustment of the rates applicable.

M. LINDBERG proposed a new text which he withdrew after intervention of M. SJÖBERG.

M. COTTIER then remarked that it is not correct to connect the tariffs with the constructing costs of the line, and that the introduction on the same system of differential tariffs according to the lines is not easily admissible, except in very special cases.

The PRESIDENT then explained that there was only a question here of an adjustment of the level of charges, a notion which appeared to him to be quite normal.

M. MILES BEEVOR thought that *Summary No. 5* could be cancelled and suggested that the idea of traffic density mentioned therein could be included in paragraph c) of *Summary No. 4*.

M. DUGAS suggested that it would be preferable to cancel *Summary No. 5*

altogether instead of inserting in *Summary No. 4* the question of traffic density which is a well determined and particular subject.

The Section then agreed to adopt this solution and *Summary No. 5 was therefore cancelled.*

M. ÜPMARK emphasised the importance of the question raised in *Summary No. 5*, and its bearing on the future of railway administration. He requested the PRESIDENT to suggest placing this point on the agenda of a future Congress. The Meeting agreed with this proposal.

The PRESIDENT stated that the following Summaries were adopted :

## SUMMARIES.

### Preamble.

« After examining the summary of « the replies prepared by the Special « Reporter and the statement of facts « obtained by the Special Reporter, the « summaries which follow have been « framed solely from the view of eco- « nomic railway administration, omitting « consideration of other aspects.

« 1. For different areas there are « variations in regard to railway opera- « tion and maintenance, periodic traffic « fluctuations, transport organisation « and economic conditions. It is there-

« fore in general not possible to state :  
« a) the volume of traffic for which  
« a new line should be built;

« b) the volume of traffic below  
« which operation of an existing line  
« should be discontinued.

« 2. Each case of building a new line  
« or continued operation of an existing  
« line must therefore be considered on  
« its merits.

« 3. For these investigations each  
« railway system ought to be able to  
« assemble reliable and sufficiently  
« detailed data of receipts and expendi-  
« ture for each prospective new line and  
« for each existing line of doubtful  
« value.

« 4. In the interpretation of the data  
« so compiled, and in the formulation of  
« a sound commercial judgment of the  
« future position, attention must neces-  
« sarily be directed to the following  
« factors :

« a) the relation of the line to the  
« general traffic of the region and its  
« contributory value as a feeder to the  
« main line;

« b) the conditions of competition or  
« co-operation with the other means of  
« transport.

The Plenary Meeting held on October 4th approved these Summaries.

## SECTION V. — Light Railways and Colonial Railways.

*President* : W. A. VRIELYNCK.

*Vice-Présidents* : A. CLEMANG, P. CHRISTENSEN, Y. GIROUD, and H. SPARROW.

*Principal Secretary* : F. VAN LIERDE.

### QUESTION XIII.

**Modernisation of the maintenance methods of the permanent way on the light railways.**

#### Preliminary documents.

Report (Austria, Belgium and Colony, Bulgaria, Denmark, Spain, Finland, France and Overseas Territories, Greece, Hungary, Italy, Luxemburg, Norway, Netherlands and Colonies, Poland, Portugal and Colonies, Rumania, Sweden, Switzerland, Syria, Czechoslovakia, Turkey and Jugoslavia), by L. RIPERT. (See *Bulletin* for May 1950, p. 877, or separate issue No. 19.)

Report (America (North and South), Burma, China, Egypt, Great Britain and North Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by J. R. FARQUHARSON. (See *Bulletin* for May 1950, p. 1069, or separate issue No. 22.)

*Special Reporter* : L. RIPERT. (See *Bulletin*, October 1950, p. 2135.)

#### Report of Section V.

(See *Daily Journal of the Session*, No. 2, pp. 17/18; No. 3, p. 12; No. 5, p. 2.)

**Meeting held on September 26th 1950.**

The PRESIDENT, before commencing the proceedings stated that the subjects for consideration by the Vth Section were Light Railways and Colonial Railways. Questionnaires were nevertheless addressed to the larger organisations. As a result the replies received dealt with the subject from very different points of view.

The PRESIDENT, proposed a definition of Light and Colonial Railways insofar as they differed from the secondary lines of the larger Administrations.

He called on M. RIPERT, *Special Reporter*, who summed up his report and read successively the proposed Summaries :

#### *Summaries Nos. 1 and 2 :*

1. The question of the modernisation of permanent way maintenance methods can be divided into 3 parts :

(a) modernisation of the maintenance properly so-called (very generally applied);

(b) modernisation of the organisation of the staff (applied on many railways);

(c) modernisation of the equipment (only applied on some railways).

2. *Maintenance methods*. — Most of the railways have replaced haphazard maintenance as required by various periodic overhauls, taking place every year on some sec-

tion of the line. The methods most widely used are the following :

— *general overhaul* of a section according to a programme including the carrying out of all operations required to correct any defects (maintenance of the material and fastenings, the level and alignment, the formation), with *partial repairs* according to need at certain points outside these sections;

— *integral overhaul* of a part of the line, affecting the material, the level and the alignment, with *reduced overhaul* of the level and tightening up the fastenings of another part, and for the rest of the lines, partial repairs as required as above.

The length of the overhaul cycles is generally 4 to 6 years.

Some railways renew the rails and sleepers on certain sections of the system every year.

Opinions are more or less unanimous on the efficacy of such systematic maintenance; the work is carried out with greater precision, lasts longer, and supervision is easier; the increase in the output obtained generally makes it possible to make economies in labour.

The PRESIDENT suggested to summarise the text of these Summaries, which in their present form are factual statements, which should be formulated in a more concise and more positive way.

The Meeting agreed and adopted in succession the 3 following Summaries, drafted by a small Committee.

#### *Summary No. 1 :*

“ 1. The view is almost unanimous as to the efficiency of systematic maintenance; most of the systems have replaced haphazard maintenance by various methods of periodic overhaul :

“ a) *General overhaul* of certain sections according to a programme, accompanied by *partial repairs* on some other parts of the system.

“ b) *Complete overhaul* of certain

sections according to a programme accompanied by a programme of *reduced overhaul* of other sections and by *partial repairs* elsewhere. »

#### *Summary No. 2 :*

After a discussion in which amongst others Messrs. RIPERT, COURSIN (*Madagascar Railways*) and DE BACKER (*Ministry of Colonies, Belgium*) took part the following text was proposed :

“ 2. The lengths of the cycles of repairs vary between 2 and 6 years according to climatic conditions, and the nature of the ballast, and are dependent on the necessity for altering the permanent way for new traffic conditions.

“ In cases where the length of the cycle is 2 years the tendency is to try to increase the length of the period. »

#### *Summary No. 3 :*

“ 3. The rails and sleepers on certain sections are renewed annually. »

The Meeting then proceeded with the examination of *Summary No. 3 of the special report* :

3. Various satisfactory methods are used for the conservation and consolidation of the material, in particular :

— restamping the fishplates or inserting packings;

— welding rail joints and building up the frogs of crossings;

— re-using damaged holes in the sleepers by using wooden pegs and drilling the pegs, or by using packings or wedges;

— conserving the bearing surfaces by the use of sole plates or wooden bearing plates;

— binding split sleepers;

— maintaining the gauge on curves of small radius by the use of wedges, stops, plates, cleats or ties.

— Adopted without alteration as *new Summary No. 4.*

*Summary No. 4 :*

4. The railways using measured shovel packing get greater precision and a better output than from tamping.

After a discussion in which Messrs. RIPERT, COURSIN, PROTAT (*Indo-China Railways*), SALES LANE (*Chemins de fer de l'Etat dans les Colonies portugaises*), DEVOS (*Société Nationale des Chemins de fer Viniaux, Belgique*), SANDERS (*Malayan Railways*), MASSERON (*Tunisian Railways*) took part, the following text was proposed as *new Summary No. 5.*:

“ 5. Measured packing cannot obviously be applied when it is a question of lifting a track considerably. Measured packing is technically better than beater packing; it is more economical (the output per man is at least doubled), provided skilled labour is available and the cost of the ballast is low. ”

*Summary No. 5 :*

5. The correction of the alignment by the versine method with a calculation of the errors and marking the correct position, used by many railways (sometimes with the assistance of a calculating machine) makes it possible to get regular curves without proceeding by trial and error on the site.

— Adopted as *new No. 6.*

*Summary No. 6 :*

6. Chemical weed-killing is replacing hand weeding on most railways; the most usual weedkiller is chlorate of soda in solution in water, or pure, or mixed with other salts.

After a discussion in which the following took part: Messrs. PROTAT, DEVOS,

COURSIN, DE FERREIRA (*Benguela Railways*), DE BUSSCHERE (*Lower Congo and Katanga Railways*), FARQUHARSON, *Reporter*, the following text was proposed as *new No. 7:*

“ 7. Chemical weed-killing is replacing hand weeding on most railways; the most usual weedkiller is chlorate of soda in solution in water, or pure, or mixed with other salts. Nevertheless in tropical regions this process is ineffective due to the high rainfall and flame throwers are substituted. ”

*Summary No. 7 :*

7. All the railways prepare maintenance programmes and check the way these are carried out by preparing graphs or tables and by other measurements made directly or recorded by equipment run over the line.

This text was slightly altered and agreed as *new No. 8:*

“ 8. All the railways prepare maintenance programmes and check the way these are carried out by preparing graphs or tables. ”

Then *Summaries Nos. 8, 9 and 10* were read out:

8. *Organisation of the staff.* — On a large number of railways, the practice of dividing the staff up into small gangs has been given up in favour of large gangs maintaining longer sections. The size of the sections and optimum number of men differ appreciably from railway to railway. This organisation makes it possible to reduce the labour required, and facilitates the application of overhaul methods and the supervision of the work, so long as certain conditions are fulfilled.

9. The homes of the men are generally sited alongside their sections, sometimes in the railway buildings. In the case of large gangs it becomes necessary to group them

at headquarters; difficulties may be encountered due to the shortage of houses, but there may be also social advantages, especially in certain very sparsely populated districts.

10. The transport of the staff to the place of work is either by individual means (most often bicycle) or collective (trucks, lorries, passenger train or bus). The large gangs usually are provided with motor trucks hauling trolleys.

After discussion, it was decided to summarise these points as shown in the following new No. 9 :

“ 9. The question of replacing small gangs by larger gangs maintaining longer lengths and the problems of lodging and transport of personnel must be considered specially in every case. The organisation of large gangs generally permits an overall reduction of manpower. ”

#### *Summary No. 11 :*

11. In order to stimulate the output of the gangs, several Administrations grant output premiums. It is generally considered that such premiums give good results.

The question of incentive schemes was the object of discussion in which Messrs. DE BUSSCHERE, RIPERT, VINCENT (*North East France Light Railways*), PROTAT, took part and the following text was proposed as new No. 10 :

“ 10. The introduction of bonuses does in fact provide an incentive in practice. It is difficult to establish the basis on which such bonuses should be based. ”

#### *Summary No. 12 :*

12. *Mechanisation of the equipment.* — Some railways make use of mechanical tools and plant worked by hand or engine driven (drills and saws for rails, jointing pulling apparatus, coachscrew spanners, drills for

sleepers, coachscrew drivers, cutters and shapers, sleeper hooping machines, mechanical tampers, etc.). The most widely used mechanical equipment are coachscrew drivers and sleeper drills. These machines save labour, whilst doing the work more accurately and less tiredly. But it is necessary to have skilled men to drive and work them. In addition their methodical use, generally as laid down in the track overhaul programme, must be on a large enough scale to make good their cost.

After a discussion in which Messrs. COURSIN, PROTAT, VINCENT, RIPERT, MASERON, DE BACKER and DEVOS, took part, the following text was proposed as new No. 11 :

“ 11. The general tendency is to mechanise tools and equipment and this considerably increase output. In certain Colonies besides, mechanisation is essential in order to conserve manpower. Mechanisation does not necessitate specially skilled manpower. ”

#### *Summary No. 13 :*

13. The results obtained by the application of the overhaul methods, the grouping of the staff into large gangs, and the mechanisation of the equipment, are generally considered satisfactory from the three points of view of technical efficiency, economic results, and social results, although it is often difficult to show the results attributable to each of them in the balance sheets.

The railways using such methods tend to extend them. Other railways are considering their adoption to some extent. In particular, the use of motor-driven tools, which is still very limited, might with advantage be developed.

— The PRESIDENT proposed the cancellation of this Summary and this suggestion was accepted.

— The PRESIDENT stated that the Summaries proposed at this meeting would

be submitted to the final approval of the Assembly at the next Session.

#### **Meeting held on September 27th 1950.**

The PRESIDENT opened the Session and submitted, for final approval by the Delegates, the Summaries provisionally adopted on 26th September 1950.

After discussion in which Messrs. COURSIN, MASSERON and TRAIN (*British Railways*) took part, *Summaries Nos. 5, 7 and 10* were amended.

The text of these Summaries, finally adopted, is as follows :

#### *Summary No. 5 :*

« 5. Measured packing is technically superior to hand tamping in the case of small lifts : it is more economical (the output per man is at least doubled) provided skilled, conscientious permanent staff are available and provided also that the cost of chippings delivered to the site is not prohibitive.

« Measured packing cannot be applied where large lifts are made. In this case mechanical tamping, preferably with large machines (compression and vibration), followed by the use of sighting boards, is recommended. »

#### *Summary No. 7 :*

« 7. Chemical weed-killing is replacing hand weeding on most railways; the most usual weedkiller is chlorate of soda in solution in water, or pure, or mixed with other salts. Nevertheless in tropical regions this process is ineffective due to the high rainfall and flame throwers are substituted in some cases. »

#### *Summary No. 10 :*

« 10. The introduction of bonuses does in fact provide an incentive in practice. It is difficult to establish the basis on which such bonuses should be based. This problem is now the subject of studies in several countries. »

— The PRESIDENT stated that the following Summaries were adopted :

#### **SUMMARIES.**

« 1. The view is almost unanimous as to the efficiency of systematic maintenance; most of the systems have replaced haphazard maintenance by various methods of periodic overhaul :

« a) *General overhaul* of certain sections according to a programme, accompanied by *partial repairs* on some other parts of the system;

« b) *Complete overhaul* of certain sections according to a programme accompanied by a programme of *reduced overhaul* of other sections and by *partial repairs* elsewhere.

« 2. The lengths of the cycles of repairs vary between 2 and 6 years according to climatic conditions, and the nature of the ballast, and are dependent on the necessity for altering the permanent way for new traffic conditions.

« In cases where the length of the cycle is 2 years the tendency is to try to increase the length of the period.

« 3. The rails and sleepers on certain sections are renewed annually.

« 4. Various satisfactory methods are

“ used for the conservation and consolidation of the material, in particular :

“ restamping the fishplates or inserting packings;

“ welding rail joints and building up the frogs of crossings;

“ re-using damaged holes in the sleepers by using wooden pegs and drilling the pegs, or by using packings or wedges;

“ conserving the bearing surfaces by the use of sole plates or wooden bearing plates;

“ binding split sleepers;

“ maintaining the gauge on curves of small radius by the use of wedges, stops, plates, cleats or ties.

“ 5. Measured packing is technically superior to hand tamping in the case of small lifts : it is more economical (the output per man is at least doubled) provided skilled, conscientious permanent staff are available and provided also that the cost of chippings delivered to the site is not prohibitive.

“ Measured packing cannot be applied where large lifts are made. In this case mechanical tamping, preferably with large machines (compression and vibration), followed by the use of sighting boards, is recommended.

“ 6. The correction of the alignment by the versine method with a calculation of the errors and marking the correct position, used by many railways (sometimes with the assistance of a calculating machine) makes it possible to get regular curves without proceeding by trial and error on the site.

“ 7. Chemical weed-killing is replacing hand weeding on most railways; the most usual weedkiller is chlorate of soda in solution in water, or pure, or mixed with other salts. Nevertheless in tropical regions this process is ineffective due to the high rainfall and flame throwers are substituted in some cases.

“ 8. All the railways prepare maintenance programmes and check the way these are carried out by preparing graphs or tables.

“ 9. The question of replacing small gangs by larger gangs maintaining longer lengths and the problems of lodging and transport of personnel must be considered specially in every case. The organisation of large gangs generally permits an overall reduction of manpower.

“ 10. The introduction of bonuses does in fact provide an incentive in practice. It is difficult to establish the basis on which such bonuses should be based. This problem is now the subject of studies in several countries.

“ 11. The general tendency is to mechanise tools and equipment and this considerably increase output. In certain colonies besides, mechanisation is essential in order to conserve manpower. Mechanisation does not necessitate specially skilled manpower.

— The Plenary Meeting held on the 29th September ratified these Summaries.

#### QUESTION XIV.

**Change over from steam locomotive traction to Diesel traction.**

##### Preliminary documents.

Report (America (North and South), Burma, China, Egypt, Great Britain and Northern Ireland, Dominions, Protectorates and Colonies, India, Iran, Iraq, Malay States and Pakistan), by A. W. OLIVIER. (See *Bulletin* for June 1950, p. 1419, or separate issue No. 29.)

Report (Austria, Belgium and Colony, Bulgaria, Denmark, Spain, Finland, France and Colonies, Greece, Hungary, Italy, Jugoslavia, Luxemburg, Norway, Holland and Colonies, Poland, Portugal and Colonies, Rumania, Sweden, Switzerland, Czechoslovakia and Turkey), by M. DIEGOLI. (See *Bulletin* for September 1950, p. 1927, or separate issue No. 39.)

*Special Reporter* : U. CANTUTTI. (See *Bulletin*, October 1950, p. 2147.)

##### Report of Section V.

(See *Daily Journal of the Session*, No. 3, p. 12 to 14; No. 5, p. 2; No. 6, p. 12.)

##### Meeting held on September 27th 1950.

The PRESIDENT mentioned that in addition to train locomotives, shunting locomotives and railcars, the conclusions dealt with large organisations, light railways and colonial railways. He then called on M. CANTUTTI, *Special reporter*.

M. CANTUTTI summed up his report and read out the conclusions relating to the heading : A) *Train locomotives* :

##### Summary No. 1 :

1. Diesel train locomotives have already, from the technical point of view, been sufficiently perfected for use in the normal railway services with a degree of safety and regularity comparable in practice to that given by the steam locomotive.

— Adopted.

After discussion in which Messrs. CANTUTTI, BOSC (*French West African Railways*), BARBAUT (*Tunisian Railways*), RICHELOT (*Office d'exploitation des transports coloniaux « OTRACO », Belgique*), SANDERS (*Malayan Railways*) took part, it was decided to cancel *Summary No. 4* and to adopt the text hereafter as *new Summary No. 2* :

« 2. It is possible with Diesel locomotives to use several single units coupled together, driven by one man. In practice up to the present time it has been found preferable to employ at least two men per train.

« For standard gauge railways the most usual size unit is from 1 000 to 2 000 HP and on narrow gauges from 600 to 1 500 HP. »

##### Summary No. 2 (new No. 3) :

2. The most important factor to be considered however is the economic side, which is greatly influenced by the high purchase price and higher amortisation charges, which can, however, be partially compensated by a very high utilisation coefficient, but above all by the price of fuel which varies considerably from one country to another.

This latter reason and the special characteristics of the service to be operated and the countries, in which they are run, are today the fundamental factors which can lead to a widely different development of Diesel traction, both as regards its importance, and the constructional types.

— Adopted.

*Summary No. 3 (new No. 4) :*

3. In the United States of America the construction of steam locomotives has practically been given up in recent years in favour of Diesels. In some African and Colonial countries, the local conditions are particularly favourable to the development of this method of traction; in other countries, especially in Europe, the question has not developed any definite tendencies to date.

After a discussion in which Messrs. DE FERREIRA (*Benguela Railways*), COURSIN (*Madagascar Railways*) and BOSC took part, the *new Summary No. 4* was adopted :

*Summary No. 4 :*

4. Diesel locomotives can be used as multiple units, driven by one man.

— This Summary was combined with the *new Summary No. 2* and was therefore cancelled.

The PRESIDENT then proposed the discussion of the Summaries relating to the heading : B) *Shunting locomotives*.

1. In European countries, Diesel shunting engines can be divided into three categories as regards power, according to the work for which they are designed :

(a) 50 to 100 HP for shunting vehicles and engines in the sheds, shops and small stations;

(b) 150 to 300 HP for shunting in the average sized stations;

(c) 400 to 700 HP for heavy shunting operations and for use in the large marshalling yards.

— Adopted as *new Summary No. 5* with the following text :

“ 5. Diesel shunting engines can be divided into three categories as regards power, according to the work for which they are designed :

“ a) 50 to 100 HP for shunting vehicles and engines in the sheds, shops and small stations;

“ b) 150 to 300 HP for shunting in the average sized stations;

“ c) 400 to 700 HP for heavy shunting operations and for use in the large marshalling yards. ”

*Summary No. 2 :*

2. In Europe, Diesel shunting engines are fairly widespread, and locotractors are used to a considerable extent already, whilst in the United States only locomotives are used.

Following comments made by M. BOSC the following text proposed by the PRESIDENT was adopted as *new No. 6* :

“ 6. It would appear that in practice the tendency is to standardise the use of Diesel shunting locomotives on all Administrations whatever their importance and nature. ”

*Summary No. 3 :*

3. For the types of the 3rd category Diesel locomotives with electric drive are generally used, though this does not exclude the hydraulic drive; in the case of the other two categories mechanical drive seems to be most widely used in view of the particularly favourable cost price, whereas the electric and hydraulic drives are more flexible in service.

After a discussion in which Messrs. DE BUSSCHERE (*Chemins de fer du Bas-Congo au Katanga*), BOSC, DE BACKER (*Ministère des Colonies, Belgique*) and RICHELOT, took part, the text was adopted as *new No. 7*, but the following paragraph was added :

“ Below 500 HP the tendency is to adopt mechanical transmissions with torque convertors. ”

*Summary No. 4 :*

4. Diesel shunting engines work very satisfactorily, and can be driven by one man and used as multiple units.

— This Summary was cancelled as the text was already included in a previous Summary.

*Summary No. 5 :*

5. The coefficients of availability and utilisation of Diesel shunting engines are higher than those for steam traction, whilst the operating costs are definitely lower.

— Adopted without alteration as *new Summary No. 8.*

*Summary No. 6 :*

6. The use of locotractors is particularly indicated from the point of view of economy, to replace steam locomotives for light or intermittent shunting operations, or, on secondary lines, to haul stopping goods trains and carry out all the necessary shunting operations involved.

After a discussion in which Messrs. BOSC, CANTUTTI, SANDERS and VINCENT (*Chemins de fer secondaires du Nord-Est, France*), took part, the following text was adopted as *new Summary No. 9:*

“ 9. The use of light Diesel locomotives is particularly indicated from the point of view of economy, to replace steam locomotives for light or intermittent shunting operations.

“ In the case of light railways light Diesel locomotives are normally used on goods trains, in which case they carry out the associated shunting operations — and on local passenger trains. »

The PRÉSIDENT then proposed that the conclusions relating to “ Railcars ” should be discussed.

*Summary No. 1 :*

1. In European countries, railcars are used almost exclusively for passenger services on secondary lines, and even for fast long distance trains on the main lines.

In the United States, railcars seem to be used to a very limited extent on secondary lines, and their development does not appear to be likely.

In Europe, it should be noted that it is during recent years that the use of railcars has increased to such a rapid extent, and it appears likely that this development will continue owing to the favour it finds with the public and the operating advantages obtained, especially the flexibility and increase in the average speeds — above all on lines with heavy gradients or many stops.

In non-European countries, the use of railcars is often justified by reasons similar to those already mentioned in connection with Diesel train locomotives.

— This Summary was adopted as *new No. 10*, after cancellation of the words “ almost exclusively ” in the first paragraph.

*Summary No. 2 :*

2. According to the type of service, two categories of railcars can be distinguished, i.e. the light type for economic services at moderate speeds, with a high degree of user, and the other for important services at higher speeds, with a greater specific power (10 and even 13 HP per tonne) and offering greater comfort.

— Adopted as *new No. 11*, without alteration.

*Summary No. 3 :*

3. Mechanical and hydraulic drives are the most usual in recent types; the engines are generally carried on the bogies and sometimes on the body.

Following comments made by M. BOSC, the following text was adopted as *new No. 12 :*

« 12. Mechanised and hydraulic transmissions are adopted most frequently in modern practice. »

*Summary No. 4 :*

4. The use of trailers, as well as coupling up in multiple units, is the general practice with the most recent types. Generally single control by one man is realised, and it is possible to pass from one unit to the other; the use of articulated rakes does not seem likely to develop on the same scale.

— Adopted, without modification, as new *Summary No. 13*.

*Summary No. 5 :*

5. The use of adhesion railcars has proved satisfactory even on lines with very heavy gradients (75 %).

Following comments made by M. VINCENT, the following text was adopted as new *Summary No. 14*:

« 14. The use of adhesion railcars has proved satisfactory even on lines with very heavy gradients. »

*Summaries Nos. 6 and 7 :*

6. The average life of railcars seems to be 15 years for the engines and 25 years for the body.

7. In the case of future constructions, the tendency is to keep to a clearly defined classification of standardised designs.

These *Summaries Nos. 6 and 7* are cancelled and at the suggestion of M. Bosc, the following conclusion was adopted as new *Summary No. 15*:

« 15. The maximum advantages of Diesel traction are realised when this form of motive power is introduced over entire sections of a system, both in the

case of train locomotives and shunting locomotives, and also in the case of railcars. »

The PRESIDENT proposed — following the discussion of Question XIV and the adoption of the conclusions, that Question XV should be discussed at the meeting of the 30th September, 1950.

**Meeting of the 2nd October 1950.**

The PRESIDENT announced that Messrs. CANTUTTI and OLIVIER had requested that paragraph c) of *Summary No. 5* should be amended as follows:

« c) 400 to 700 HP for heavy shunting operations and for use in large marshalling yards. In the United States of America, the maximum is of the order of 1 000 HP. »

— The Meeting adopted this modification.

— The full text of the Summaries adopted is given hereafter:

**SUMMARIES.**

**A. Train locomotives.**

« 1. Diesel train locomotives have already, from the technical point of view, been sufficiently perfected for use in the normal railway services with a degree of safety and regularity comparable in practice to that given by the steam locomotive.

« 2. It is possible with Diesel locomotives to use several single units coupled together, driven by one man. In practice up to the present time it has been found preferable to employ at least two men per train.

« For standard gauge railways the most usual size unit is from 1 000 to 2 000 HP and on narrow gauges from 600 to 1 500 HP.

« 3. The most important factor to be considered however is the economic side, which is greatly influenced by the high purchase price and higher amortisation charges, which can, however, be compensated by a very high utilisation coefficient, but above all by the price of fuel which varies considerably from one country to another.

« This latter reason and the special characteristics of the services to be operated and the countries in which they are run, are today the fundamental factors which can lead to a widely different development of Diesel traction, both as regards its importance, and the constructional types.

« 4. In the United States of America the construction of steam locomotives had practically been given up in recent years in favour of Diesels. In some African and Colonial countries, the local conditions are particularly favourable to the development of this method of traction; in other countries, especially in Europe, the question has not developed any definite tendencies to date.

### B. Shunting locomotives.

« 5. Diesel shunting engines can be divided into three categories as regards power, according to the work for which they are designed :

« a) 50 to 100 HP for shunting vehicles and engines in the sheds, shops and small stations;

« b) 150 to 300 HP for shunting in the average sized stations;

« c) 400 to 700 HP for heavy shunting operations and for use in the large marshalling yards. In the United States of America, the maximum is of the order of 1 000 HP.

« 6. It would appear that in practice the tendency is to standardise the use of Diesel shunting locomotives on all administrations whatever their importance and nature.

« 7. For the types of the 3rd category, Diesel locomotives with electric drive are generally used, though this does not exclude the hydraulic drive; in the case of the other two categories, mechanical drive seems to be most widely used in view of the particularly favourable cost price, whereas the electric and hydraulic drives are more flexible in service.

« Below 500 HP the tendency is to adopt mechanical transmissions with torque convertors.

« 8. The coefficients of availability and utilisation of Diesel shunting engines are higher than those for steam traction, whilst the operating costs are definitely lower.

« 9. The use of light Diesel locomotives is particularly indicated from the point of view of economy, to replace steam locomotives for light or intermittent shunting operations.

« In the case of light railways, light Diesel locomotives are normally used on goods trains, in which case they carry out the associated shunting

“ operations — and on local passenger  
“ trains.

### C. Railcars.

“ 10. In European countries, railcars  
“ are used for passenger services on  
“ secondary lines and even for fast long  
“ distance services on main lines.

“ In the United States, railcars seem  
“ to be used to a very limited extent on  
“ secondary lines and their development  
“ does not appear to be likely.

“ In Europe, it should be noted that  
“ it is during recent years that the use  
“ of railcars has increased to such a  
“ rapid extent, and it appears likely that  
“ this development will continue owing  
“ to the favour it finds with the public  
“ and the operating advantages obtained,  
“ especially the flexibility and increase  
“ in the average speeds — above all on  
“ lines with heavy gradients or many  
“ stops.

“ In non-European countries, the use  
“ of railcars is often justified by reasons  
“ similar to those already mentioned in  
“ connection with Diesel train locomo-  
“ tives.

“ 11. According to the type of ser-  
“ vice, two categories of railcars can be  
“ distinguished, i. e. the light type for  
“ economic services at moderate speeds,  
“ with a high degree of user, and the  
“ other for important services at higher  
“ speeds, with a greater specific power  
“ (10 and even 13 HP per ton) and  
“ offering greater comfort.

“ 12. Mechanised and hydraulic  
“ transmissions are adopted most fre-  
“ quently in modern practice.

“ 13. The use of trailers, as well as  
“ coupling up in multiple units, is the  
“ general practice with the most recent  
“ types. Generally single control by  
“ one man is realised, and it is possible  
“ to pass from one unit to the other;  
“ the use of articulated rakes does not  
“ seem likely to develop on the same  
“ scale.

“ 14. The use of adhesion railcars has  
“ proved satisfactory even on lines with  
“ very heavy gradients.

“ 15. The maximum advantages of  
“ Diesel traction are realised when this  
“ form of motive power is introduced  
“ over entire sections of a system, both  
“ in the case of train locomotives and  
“ shunting locomotives, and also in the  
“ case of railcars.

— The Plenary Meeting held on  
October 4th ratified these Summaries.

### QUESTION XV.

#### Signalling on single track lines.

##### Preliminary documents.

Report (America (North and South),  
Burma, China, Egypt, Great Britain and  
North Ireland, Dominions, Protectorates  
and Colonies, India, Iran, Iraq, Malay  
States and Pakistan), by H. W. JACKSON.  
(See *Bulletin*, May 1950, p. 1047, or  
separate issue No. 21.)

Report (Austria, Belgium and Colony,  
Bulgaria, Czechoslovakia, Denmark, Finland,  
France and Overseas Territories,  
Greece, Hungary, Italy, Luxemburg,  
Netherlands and Colonies, Norway, Poland,  
Portugal and Colonies, Rumania,

Spain, Sweden, Switzerland, Syria, Turkey and Yugoslavia), by W. A. VRIEYNNCK and P. THOMAS. (See *Bulletin*, July 1950, p. 1487, or separate issue No. 31.)

*Special Reporter* : W. A. VRIEYNNCK.  
(See *Bulletin*, October 1950, p. 2157.)

#### Report of Section V.

(See *Daily Journal of the Session*, No. 6, pp. 12/13; No. 8, p. 1.)

#### Meeting held on October 2nd 1950.

M. VRIEYNNCK (*President and Special Reporter*) summed up his report and stated that the 3rd Section, during their examination of Question IX had adopted a summary (IV, 1) which illustrated the difficulties, which standardisation of the different signalling systems now in use, presented.

He then proceeded to read his Summaries.

#### Summary No. 1 :

1. Lines of small importance carrying a light regular traffic can very well dispense with any special single line signalling, the crossing of trains taking place at definite points laid down in advance and which must be adhered to.

After a long discussion in which Messrs. JACKSON, *Reporter*, Lt. Col. WILSON (*Ministry of Transport, Great Britain*), DE BACKER (*Ministère des Colonies, Belgique*), THOMAS, *Joint Reporter*, took part, and during which the different operating methods on single line railway systems were described, this Summary was adopted with the following wording :

« 1. Lines of small importance carrying a light regular traffic can very well

dispense with single line signalling. Crossings of trains taking place at definite points laid down in advance, or according to pre-established regulations. »

#### Summary No. 2 :

2. Lines lending themselves to be worked with a shuttle service use the ordinary plain train-staff.

Adopted without modification.

#### Summary No. 3 :

3. The lines carrying a more important and relatively irregular traffic, passing through districts where the cost of labour is low and technically competent persons rarely met with (as in the Colonies) have usefully had recourse to the Webb & Thompson electric train-staff, which affords all the safety that can be desired. It is moreover of simple design and robust construction.

After discussion in which Messrs. JACKSON, Lt. Col. WILSON, RICHELOT (*Office d'Exploitation des Transports Coloniaux, Belgique*), MASSERON and HARTER (*Indo-Chinese Railways*), took part, the following text was adopted :

« 3. Lines carrying a more important and relatively irregular traffic, in Administrations where personnel are stationed at the crossing points, have usefully had recourse to electric token instruments. This system gives the degree of safety required. It is moreover of simple design and robust construction. »

#### Summary No. 4 :

4. Lines where there is considerable traffic and overall speed is high tend to adopt automatic signalling. When a line is laid on its own inaccessible right of way, track circuits are used. If it is laid alongside or in the roadway itself, i.e. if it has the character of

a tramway line, it becomes necessary to use special circuits and overhead contact makers, or « trolley contactors ». It is in any case useful to arrange for repeating lights, as this increases the safety of operation.

It appears that amongst the railway systems whose opinion has been asked, there are very few that are of this kind. This explains why the Belgian National Light Railways Company is apparently the only one using this system of signalling.

After a discussion in which Messrs. JACKSON, MASSERON and THOMAS, took part, the following text was adopted :

« 4. Lines where there is considerable traffic and overall speed is high tend to adopt automatic signalling. When a line is laid on its own inaccessible right of way, track circuits are used. If it is laid alongside or in the roadway itself, i. e. if it has the character of a tramway line, it becomes necessary to use special circuits and overhead contact makers, or « trolley contactors ». It is in any case useful to arrange for repeating lights, as this increases the safety of operation. »

#### *Summary No. 5 :*

5. All lines are agreed in not permitting, under normal conditions, more than one train at a time to be in a single line section and in prohibiting setting back in the section.

After a discussion in which Messrs. JACKSON and MASSERON, took part, the following text was adopted :

« 5. a) The majority of lines are agreed in not permitting, under normal conditions, more than one train at a time on a single line section.

« b) All Administrations are agreed that setting back should be forbidden as far as ordinary trains are concerned. »

#### *Summary No. 6 :*

6. On those lines where the traffic is regulated by telephone, the signals used appear to be those controlling the stations themselves rather than the actual single line. In consequence they are outside the scope of the matter under discussion in this statement.

After an exchange of views between Messrs. RIPERT (*Société Générale des Chemins de fer Economiques, France*), PROTAT (*Chemins de fer de l'Indochine*), and HARTER, the following text was adopted :

« 6. On those lines where the traffic is regulated by telephone or telegraph, the signals used appear to be those controlling the stations themselves rather than the actual single line. In consequence they are outside the scope of the matter under discussion in this statement. »

#### *Summary No. 7 :*

7. Telephone working under the control of staff located at fixed points along the line (traffic controllers or regulators, station-masters) allows of dealing easily and quickly with any unexpected situation that may arise. It is conceivable that it will continue to be used where it is necessary to employ station-masters on account of there being a considerable goods traffic to be dealt with.

After a discussion in which Messrs. RIPERT, RICHELOT, PORTAT and HARTER, took part, the text was adopted with some slight alterations.

Finally, the Meeting considered the « Note » appearing after the Summaries of the Special Reporter :

#### *Note.*

No railway to our knowledge is making use of radio-telephony. This implies control over the train running by a traffic controller

or dispatcher constantly in communication with the guards of the various trains, to whom he would have to give instructions and of which they would be able to acknowledge receipt. This system would cost but little to install and to maintain, and it would be able to be worked quickly and allow of dealing easily with any unexpected conditions. From the safety point of view, however, it would evidently offer all the disadvantages of systems liable to give rise to mistakes when transmitting messages, a defect inherent in all telephonic communications.

Certain Delegates mentioned that radio-telegraphy is actually in use for communication in Indochina and on the « Méditerranée au Niger » Railways.

After an exchange of opinions in which Messrs. MASSERON, HARTER, PROTAT, RIPERT, RICHELOT, JACKSON, Lt. Col. WILSON and THOMAS took part, the following additional summary was adopted as No. 8 :

« 8. Certain systems have made use of radio-telegraphic communication between control personnel and train guards. This system which is still in the experimental stage has given complete satisfaction and would definitely appear to have future possibilities. »

— As all the points on the agenda had been considered, the PRESIDENT thanked the Delegates and closed the meeting.

— The text of the Summaries adopted is given hereafter :

### SUMMARIES.

« 1. Lines of small importance carrying a light regular traffic can very well dispense with single line signalling. Crossings of trains taking place at definite points laid down in advance,

« or according to pre-established regulations.

« 2. Lines lending themselves to be worked with a shuttle service use the ordinary plain train-staff.

« 3. Lines carrying a more important and relatively irregular traffic, in administrations where personnel are stationed at the crossing points, have usefully had recourse to electric token instruments. This system gives the degree of safety required. It is moreover of simple design and robust construction.

« 4. Lines where there is considerable traffic and overall speed is high tend to adopt automatic signalling. When a line is laid on its own inaccessible right of way, track circuits are used. If it is laid alongside or in the roadway itself, i. e. if it has the character of a tramway line, it becomes necessary to use special circuits and overhead contact makers, or « trolley contactors ». It is in any case useful to arrange for repeating lights, as this increases the safety of operation.

« 5. a) The majority of lines are agreed in not permitting, under normal conditions, more than one train at a time on a single line section;

« b) All Administrations are agreed that setting back should be forbidden as far as ordinary trains are concerned.

« 6. On those lines where the traffic is regulated by telephone or telegraph, the signals used appear to be those controlling the stations themselves

“ rather than the actual single line. In consequence they are outside the scope of the matter under discussion in this statement.

“ 7. Telephone and telegraph working under the control of staff located at fixed points along the line (traffic controllers or regulators, stationmasters) allows of dealing easily and quickly with any unexpected situation that may arise. It is conceivable that

“ it will continue to be used where it is necessary to employ stationmasters.

“ 8. Certain systems have made use of radio-telegraphic communication between control personnel and train guards. This system which is still in the experimental stage has given complete satisfaction and would definitely appear to have future possibilities. ”

— These Summaries were ratified by the Plenary Meeting held on October 4th.

# SUMMARY REPORT OF THE DISCUSSIONS AT THE GENERAL MEETINGS

(September 29th and October 4th 1950.)

*President : Dr. Eng. G. DI RAIMONDO.*

*General Secretaries : Messrs. P. GHILAIN, and Dr. Eng. M. VALDIVIESO.*

*Assistant General Secretary : Ch. E. WHITWORTH.*

**Meeting held on September 29th 1950.**

— The session was opened at 9.30 a. m. under the presidency of Sig. DI RAIMONDO, Dr. Eng., *President of the Session.*

The PRESIDENT expressed pleasure at the large number of delegates present and asked M. GHILAIN, *Vice-President and General Secretary of the Association*, to take, in succession, the various items on the agenda :

1. *Increase in the number of mandates of the Permanent Commission.*

M. GHILAIN, *General Secretary*, asked the ratification of the decisions taken at the meetings of the 1st June 1949, 25th February 1950 and 25th September 1950 of the Permanent Commission, concerning the allocation of four new mandates respectively: one to Norway, one to Ireland and two to Italy. These mandates were granted to the following personalities :

E. SUNDT, general manager of the Norwegian State Railways;

T. C. COURTNEY, chairman of the Coras Iompair Eireann (Ireland);

Dr. Eng. G. LASZ, chief of the Staff and General Affairs Department of the Italian State Railways;

Dr. Eng. A. CUTTICA, chief of the Locomotives and Rolling Stock Department of the Italian State Railways.

In addition, M. G. DI RAIMONDO, general manager of the Italian State Railways becomes *life Member* of the Permanent Commission, in his quality of President of the XVth Session.

— *Approved with loud applause.*

2. *Ratification of the mandates granted by the Permanent Commission between the two last Sessions.*

M. GHILAIN, *General Secretary*, stated that the following mandates, conferred by the Permanent Commission in the interval between the two Sessions (Lucerne 1947 and Rome) are submitted for ratification by the Plenary Meeting :

*Appointed on February 14th 1948 :*

Messrs. R. LUNA;  
P. P. MARTIN;  
M. DEVOS;  
H. E. El Sayed GAWDAT Bey (replaced);  
Sir Gilmour JENKINS;  
Mr. V. M. BARRINGTON-WARD.

*Appointed on December 4th 1948 :*

Messrs. VANDERBORGHTE;  
David BLEE;  
H. E. Abdel Megid BADR Pacha (replaced);  
H. E. Dr. Sayed Abdel WAHID Bey.

*Appointed on June 1st 1949 :*

Messrs. E. G. J. ÜPMARK;  
F. Ch. BADHWAR;  
H. E. Khadr GABR Bey;  
Messrs. W. H. MAASS (replaced);  
Eng. Mayer GRÜMBERG;  
E. SUNDT.

*Appointed on February 25th 1950 :*

Messrs. Dr. HUYBERECHTS;  
R. A. RIDDLES;  
CSANADI;  
Eng. Ugo VALLECCHI (replacement proposed);  
H. E. Abdel Rahman el Sayed AMMAR Bey;  
H. E. Aly Zaki el ORABY Pacha;  
Mr. T. C. COURTNEY.

— Approved with applause.

3. *Renewal of mandates expiring at the XVth Session.*

The General Secretary stated that according to the Rules and Regulations one third of the members of the Permanent Commission shall retire at each Congress and shall be eligible for re-elections. The mandates of the following Members of the Permanent Commission had come to an end; these Members accepted the renewal of their mandates and were now proposed for re-election :

Messrs. F. H. DELORY;  
DORGES;  
ARMAND;  
F. Ch. BADHWAR;  
H. E. Abdel Rahman el Sayed AMMAR Bey;  
Messrs. D. BLEE;  
J. BOUCIQUÉ;  
R. CLAUDON;  
DARGEOU;  
W. T. FARICI;  
H. E. Khadr GABR Bey;  
Messrs. Ranald J. HARVEY;  
A. KRIZ;  
Eng. F. MARIN;  
P. NOLET DE BRAUWERE;  
J. H. NUELLE;  
J. M. RIVERO DE AGUILAR;  
E. D. TERKELSEN;  
H. E. Dr. Sayed Abdel WAHID Bey;  
R. A. RIDDLES.

— These members were re-elected with applause.

4. *Amendment of the list of countries belonging to the Association.*

The Assembly approved the amendments proposed in the list of countries belonging to the Association, appended to the Rules and Regulations.

According to art. 4 of these Rules and Regulations, the Permanent Commission had already approved these modifications.

The List of these countries is at present as follows :

Argentine;	Jugoslavia;
Australia (Commonwealth of);	Lebanon;
Austria;	Luxemburg;
Belgium and Colony;	Mexico;
Bolivia;	New Zealand;
Brazil;	Nicaragua;
Bulgaria;	Norway;
Burma;	Pakistan;
Canada;	Paraguay;
Ceylon;	Peru;
Chili;	Poland;
China;	Portugal and Colonies;
Colombia;	Rumania.
Costa Rica;	Salvador;
Cuba;	Siam;
Czechoslovakia;	Spain;
Denmark;	Sweden;
Dominica;	Switzerland;
Ecuador;	Syria;
Egypt;	Turkey;
Finland;	Union of South Africa;
France, Algeria, Tunisia, Colonies and Protectorates;	United States of America;
Germany;	Uruguay;
United Kingdom of Great Britain and Northern Ireland and the territories for whose international relations the United Kingdom is responsible;	Viet-Nam.
Greece;	
Hayti;	
Holland and Colonies;	
Hungary;	
India;	
Indonesia;	
Irak;	
Iran;	
Irish Free State;	
Italy;	
Japan;	

#### *5. Approval of the accounts of the XIVth Session. (1938 to 1947.)*

M. GHILAIN read the report of the two auditors responsible for the examination and approval of the accounts.

— *The accounts were adopted by the Assembly.*

#### *6. Appointment of Auditors.*

The Meeting approved the appointment of M. Ch. THOMAS, Chef du Service de la Comptabilité Générale et des Finances de la S. N. C. F., and Mr. E. A. W. DICKON, Treasurer assistant to Chief financial officer, British Railways, as auditors for the examination and approval of the accounts of the XVth Session.

### 7. Examination of the summaries adopted in the different Sections.

In view of the procedure adopted for the preparation and agreement of the summaries, the PRESIDENT suggested, in order to shorten the meeting, that he would enumerate the summaries without reading them. He observed that these texts had already been published in full in the *Daily Journal of the Session*. This procedure was agreed to.

The summaries of questions I, II, IV, V, VII, X, XI, XIII and XIV were approved by the Assembly.

In regard to the English text of summary No. 10 of Question VII, the Assembly approved, on the proposal of M. WITHWORTH, the replacement of the words « marking off » by « numbertaking ».

The summaries of Question IX were adopted, with the exception of summary No. 6, the text of which will be examined further in the course of the next meeting of the Section.

In the heading of Question XI, the words « médico-sociaux » in the French text were placed by « médicaux et sociaux ».

The summaries in respect of Questions III, VI, VIII, XII and XV will be considered at the next plenary session.

### 8. Other matters.

As no further delegate raised any matter, the PRESIDENT declared the meeting closed at 10 45 a. m.

### Meeting held on October 4th 1950.

— The session was opened at 9.30 a. m. under the presidency of Sig. DI RAMONDO, Dr. Eng., President of the Session.

The PRESIDENT requested M. GHILAIN to make a statement in regard to the first item on the agenda :

#### 1. Choice of venue for the next Congress.

M. GHILAIN, General Secretary, announced that the next meeting of the Enlarged Permanent Commission would take place in Stockholm, in 1952.

As no proposal had yet been received in regard to the venue of the next Congress, he requested the meeting to authorise the Permanent Commission itself to determine this.

— *M. Ghilain's proposal was agreed to.*

#### 2. Approval of the summaries adopted in the different Sections since the Plenary Session of 29th September 1950.

M. GHILAIN enumerated the summaries in regard to Questions III, VI, VIII, XII and XV, together with summary No. 6, chapter III of Question IX and summary No. 5, paragraph c) of Question XIV. These summaries were all approved by the meeting.

### 3. Other matters.

As no delegate raised any further matter, the PRESIDENT declared the meeting close at 10.00 a. m. after having warmly thanked the delegates for their conscientious and valuable contribution to the work of the meetings.

# CLOSURE OF THE SESSION

(October 4th 1950.)

The closing ceremony of the XVth Session took place in the great auditorium of Rome University under the chairmanship of Dr. Eng. G. DI RAIMONDO, *President of the Session.*

The PRESIDENT in opening the meeting delivered the following speech :

« GENTLEMEN,

« Having come to the end of the XVth Session of the Congress, we can say with satisfaction that the hopes and wishes expressed in this very room have indeed been realised.

« In effect, by the imposing and invaluable work accomplished during this Session, it has once more been confirmed that the Association is not merely useful but is essential for the perfecting and progress of the railway.

« It would take too long and be superfluous to recall again all the problems dealt with and the summaries adopted, as you have all followed with interest the works of the sessions.

« However, casting a brief glance upon the results obtained, we get the impression of tremendous activity. First of all, the problems were carefully considered by the Administrations themselves; then the reports were drawn up, practical experience going side by side with scientific knowledge; and here in Rome, calm and objective discussions took place which ended in the formulating of summaries which are not theoretical statements but constitute — without any doubt — a

useful and certain guide for the further activities of the railways.

« I should like all those who talk of the railways in a facile manner and put forward superficial criticisms, throwing doubts upon their future to read the reports of the Congress. .

« This would show them that the whole wide range of questions was covered here — from those dealing with the permanent way and works to those covering the operating, safety, organisation, and economic and social aspects.

« This would prove to them that the railways are not solely concerned with the fundamental problems, but also with those questions which whilst being a matter of detail, are yet very important, and that their aim is to improve the railway services ever more and more and meet the most varied requirements of their clients.

« Finally, they would see that the railways today are more alive than ever, inspired by a new impulse, open to up-to-date and progressive ideas, determined to work hard to fulfil their task ever more completely, a task which as has already been said, is not merely limited to the economic field, but also and above all includes those of a political and social nature.

« GENTLEMEN,

« It is evident that the above mentioned results have been achieved thanks to the efficient and spontaneous co-operation of

all those who have contributed to the success of this Congress; whether in the technical-scientific field or in that of its organisation.

« Consequently, I wish to offer my heartfelt thanks to the Reporters for the invaluable material they collected together, and to the Presidents of the Sections for the competence and ability with which they directed the discussions.

« Our particular thanks are due to M. GHILAIN, *General Secretary*, who should rather be called the great organiser of the Congress, who directed the technical works with his well-known skill and experience; to M. VALDIVIESO and to the Secretariat of the Executive Committee, who were able to overcome the numerous difficulties in the actual organisation of the Congress.

« To mention all those who so nobly co-operated, would involve a very long list, but we are not unmindful of their self-sacrifice and intelligent labours, and we thank them all most cordially.

« I must also thank the Local Organising Committee, the Rector of the University of Rome, the Mayor of the Capital, and many others, both organisations and individuals, executives or assistants, who rendered such great services to the Congress.

« Nor must we forget the aimable ladies who by their gracious presence introduced a note of gentleness into our studious and responsible surroundings.

« GENTLEMEN,

« During your sojourn in Italy, in addition to sharing in the work of the Congress you have had the opportunity

of seeing Italy going full out in her work of reconstruction and improvement.

« She could not, unhappily, show you herself at her best, since the wounds she received during the war are still, too recent, but you have been able to see her soul, that is to say the soul of a country devoted entirely to work, to the arts, and to the skills of peace.

« On your arrival in Italy, you received a welcome which came right from her heart; when you depart, it will be with the most cordial leave-taking.

« This country tells you once again that her only aims are co-operation and peace, and invite you to return and visit her again, when you will find her still better. » (*Long applause.*)

M. DELORY, *President of the Association*, then replied by the speech hereafter :

« Mr. PRESIDENT,

« GENTLEMEN,

« The works of the XVth Session are now terminated.

« The Plenary Assembly during two meetings held one last week and the other this morning adopted the Summaries which the different Sections of the Congress proposed for the 15 questions laid before them.

« These Summaries, which were formulated after long and thorough discussions in which the most eminent specialists of the day took part, will we are sure be kept in mind by all the Railway Administrations and enable them to meet at least to some extent the difficulties with which they are faced at the present time.

« When the amplitude of the questions dealt with is taken into consideration, the solutions tried, the atmosphere in which they were adopted, and all the crucial times through which the railways are passing, it can be affirmed that the Rome Congress will be numbered amongst the most important of those organised by our Association.

« Such results cannot be achieved without considerable and fruitful collaboration.

« If the Congress has proved such a success, it is due to the collaboration and generosity of the Italian Government and in particular of M. D'ARAGONA, Minister of Transport, as well as the Administration of the Italian State Railways; it is due to all the members of the Local Committee; it is due to the collaboration of the members of the Permanent Commission, to the General Secretary, to the Presidents of the Sections, to the Principal Secretaries, to the Secretaries, to the Reporters and to the Special Reporters.

« I regret that it is impossible to mention by name all those who by their devotion and unceasing, difficult and delicate labours, have contributed to the fortunate climat to our work.

« I must however make mention of the President of the Session, M. DI RAIMONDO, and the two General Secretaries, M. GHILAIN, *General Secretary of the Association* and M. VALDIVIESO, *Secretary of the Executive Organisation Committee*, who assumed the difficult task of directing the organisation of this Congress.

« And we wish to take this opportunity of reiterating our thanks to all the authorities who have enabled the delegates and their families to enjoy the splendours of Italy.

« We will soon go our different ways.

« Many delegates will only leave in a few days time as they are profiting by the excellent excursions organised in the most beautiful regions of Italy.

« When we return to our own countries, we shall take away with us an unforgettable memory, and many families throughout the various parts of the world will talk about the Rome Congress, for a long time to come, with enthusiasm and gratitude. » (*Long applause.*)

Then, on behalf of the Italian Government, Mr. BATTISTA, *Under Secretary of State and Vice-President of the Honorary Committee*, declared the Session closed amidst long and enthusiastic cheers.

# List of Members of the Permanent Commission OF THE INTERNATIONAL RAILWAY CONGRESS ASSOCIATION

after the decisions taken at the Plenary Meeting held on the 29th September 1950  
(Art. 6 of the Rules and Regulations).

## *President :*

**F. H. Delory** (3), directeur général de la Société Nationale des Chemins de fer belges; 19, rue du Beau-Site, Bruxelles.

## *Vice-presidents :*

**Goursat** (1), directeur de la Région du Nord de la Société Nationale des Chemins de fer français; 18, rue de Dunkerque, Paris (X<sup>e</sup>);

**P. Ghilain** (2), directeur du Service du Matériel et des Achats de la Société Nationale des Chemins de fer belges; 19, rue du Beau-Site, Bruxelles.

## *Members of the Executive Committee :*

**Dorges** (3), inspecteur général des Ponts et Chaussées, secrétaire général aux Travaux publics, directeur général des Chemins de fer et des Transports au Ministère des Travaux publics et des Transports; 244, boulevard Saint-Germain, Paris;

**Lord Hurcomb** (1), Chairman of the British Transport Commission; 55, Broadway, London, S. W. 1;

**Sir Gilmour Jenkins** (2), Secretary to Minister of Transport (Great-Britain); Berkeley Square House, Berkeley Square, London, W. 1.

## *Ex-presidents of session, members ex-officio :*

**Ing. G. di Raimondo**, directeur général des Chemins de fer de l'Etat italien; Rome;

**S. E. Ibrahim Fahmy Kerim Pacha**; Le Caire;

**Dr W. Meile**, ancien président de la Direction générale des Chemins de fer fédéraux suisses; Brügglerweg, 11, Berne.

## *Members :*

**S. E. Abdel Rahman el Sayed Ammar Bey** (3), sous-secrétaire d'Etat au Ministère des Communications d'Egypte; Le Caire;

**Armand** (3), directeur général de la Société Nationale des Chemins de fer français; 88, rue St Lazare, Paris (IX<sup>e</sup>);

**F. Ch. Badhwar** (3), Member, Railway Board, Ministry of Railways, Government of India; New Delhi;

**V. M. Barrington-Ward** (2), member of the Railway Executive (British Railways); 222, Marylebone Road, London, N. W. 1;

**M. Beevor** (1), Chief secretary and legal adviser to the British Transport Commission; 55, Broadway, London, S. W. 1;

**Besnard** (2), chef de service adjoint au directeur général des Chemins de fer et des Transports, Ministère des Travaux publics et des Transports; 244, boulevard Saint-Germain, Paris;

**David Blee** (3), member of the Railway Executive (British Railways); 222, Marylebone Road, London, N. W. 1;

**J. Boucqué** (3), directeur du Service de la Voie de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Bruxelles;

**Ch. Boyaux** (2), directeur général adjoint de la Société Nationale des Chemins de fer français; 88, rue Saint-Lazare, Paris (IX<sup>e</sup>);

**R. Claudon** (3), inspecteur général des Ponts et Chaussées, vice-président du Conseil d'administration de la Société Nationale des Chemins de fer français; 88, rue Saint-Lazare, Paris (IX<sup>e</sup>);

**M. W. Clement** (1), Chairman of the Board Pennsylvania Railroad Company; Broad Street Station Building, 1617, Pennsylvania Boulevard, Philadelphia, 4, Pa.;

**Dr R. Cottier** (1), directeur de l'Office Central des Transports Internationaux par Chemins de fer; Berne;

**T. C. Courtney** (3), Chairman of the Coras Iompair Eireann, Kingsbridge Station, Dublin;

(1) Retires at the 16th session.

(2) Retires at the 17th session.

(3) Retires at the 18th session.

- Csanadi** <sup>(1)</sup>, Directeur Général des Chemins de fer de l'Etat hongrois; Budapest;
- D<sup>r</sup> Ing. A. Cuttica** <sup>(3)</sup>, chef du Service du Matériel et de la Traction des Chemins de fer de l'Etat italien; Florence;
- Dargeou** <sup>(3)</sup>, directeur du Service central du Mouvement de la Société Nationale des Chemins de fer français; 8, rue de Londres, Paris, (IX<sup>e</sup>);
- J. de Aguinaga** <sup>(2)</sup>, directeur général adjoint du Réseau National des Chemins de fer espagnols; Madrid;
- F. H. Delory** (already named);
- F. Q. den Hollander** <sup>(1)</sup>, président des Chemins de fer néerlandais; S. A.; Utrecht;
- Ing. V. Désic** <sup>(2)</sup>, professeur à la Faculté Technique de Belgrade, Conseiller permanent du Ministère des Chemins de fer de la République fédérative populaire yougoslave; Belgrade;
- M. Devos** <sup>(1)</sup>, directeur général de la Société Nationale belge des Chemins de fer vicinaux; 14, rue de la Science, Bruxelles;
- Ing. G. di Raimondo** (already named);
- Dorges** (already named);
- S. E. Aly Zaki El Oraby Pacha** <sup>(1)</sup>, Ministre des Communications d'Egypte; Le Caire;
- W. T. Farici** <sup>(3)</sup>, president, Association of American Railroads; Transportation Building, Washington, 6, D. C.;
- S. E. Khadr Gabr Bey** <sup>(3)</sup>, directeur général adjoint de l'Administration des Chemins de fer, Télégraphes et Téléphones de l'Etat égyptien; Le Caire;
- P. Ghilain** (already named);
- Goursat** (already named);
- Ing. Mayer Grümberg** <sup>(2)</sup>, directeur général des Chemins de fer roumains; Bucarest;
- Ranald J. Harvey** <sup>(3)</sup>, consulting engineer to the Government of New Zealand (Railways); 34, Victoria Street, Westminster, London, S. W. 1;
- Lord Hurcomb** (already named);
- D<sup>r</sup> Huyberechts** <sup>(2)</sup>, directeur général adjoint de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Bruxelles;
- Sir Gilmour Jenkins** (already named);
- Ing. Ch. Kalitzov** <sup>(2)</sup>, chef de la Section du mouvement des Chemins de fer et des Ports de l'Etat bulgare; Sofia;
- A. Kriz** <sup>(3)</sup>, ingénieur, conseiller supérieur de Section au Ministère des Communications de la République tchécoslovaque; Prague;
- D<sup>r</sup> N. Laloni** <sup>(1)</sup>, chef du Service Commercial et du Trafic des Chemins de fer de l'Etat italien; Rome;
- D<sup>r</sup> Ing. G. Lasz** <sup>(3)</sup>, chef du Service du Personnel et des Affaires Générales des Chemins de fer de l'Etat italien; Rome;
- Lemaire** <sup>(2)</sup>, directeur à la Société Nationale des Chemins de fer français; 88, rue Saint-Lazare, Paris (IX<sup>e</sup>).
- R. Lévi** <sup>(2)</sup>, directeur, chef du Service technique des Installations fixes de la Société Nationale des Chemins de fer français; 42, rue de Châteaudun, Paris;
- G. Lindenberg** <sup>(3)</sup>, advisory engineer to the High Commissioner for the Union of South Africa; South Africa House, Trafalgar Square, London, W. C. 2;
- C. Lucchini** <sup>(2)</sup>, président de la Direction générale des Chemins de fer fédéraux suisses; Berne;
- Ing. R. Luna** <sup>(2)</sup>, directeur général des Chemins de fer de l'Etat argentin; Buenos-Aires;
- M. Malderez** <sup>(2)</sup>, secrétaire général du Ministère des Communications de Belgique; 17a, rue de la Loi, Bruxelles;
- Ing. F. Marin** <sup>(3)</sup>, vice-directeur général des Chemins de fer de l'Etat italien; Rome;
- Ing. P. P. Martin** <sup>(1)</sup>, directeur national de la Planification et de la Coordination du Ministère des Transports de la République d'Argentine; Buenos-Aires;
- F. Mayer** <sup>(3)</sup>, conseiller ministériel, Secrétaire général des Chemins de fer fédéraux autrichiens; 9, Elisabethstrasse, Vienne I;
- D<sup>r</sup> W. Meile** (already named);
- Sir Eustace Missenden** <sup>(1)</sup>, Chairman of the Railway Executive (British Railways); 222, Marylebone Road, London, N. W. 1;
- Sir Alan Mount** <sup>(2)</sup>, consultant to the Railway Executive (British Railways); 222, Marylebone Road, London, N. W. 1.;

<sup>(1)</sup> Retires at the 16th session.

<sup>(2)</sup> Retires at the 17th session.

<sup>(3)</sup> Retires at the 18th session.

- P. Nolet de Brauwere (3), Secrétaire Général de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Bruxelles;
- J. H. Nuelle (3), président, Delaware & Hudson Railroad Corporation; 32, Nassau Street, New York City;
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- G. Pader (1), secrétaire général honoraire de l'Union internationale des Chemins de fer, conseiller technique attaché à la Présidence du Comité de gérance de l'U. I. C; 10, rue de Prony, Paris;
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- J. M. Rivero de Aguilar (3), directeur général du Réseau National des Chemins de fer espagnols; Madrid;
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- E. D. Terkelsen (3), directeur général des Chemins de fer de l'Etat danois; 40, Sølvgade Copenhague, K;
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- J. Vanderborght (1), directeur du Service de l'Exploitation de la Société Nationale des Chemins de fer belges; 17, rue de Louvain, Bruxelles;
- H. van Galen Last (3), directeur général des Transports au Ministère des Transports et du Waterstaat; La Haye;
- F. Perez Villamil (2), sous-directeur général du Réseau National des Chemins de fer espagnols; Madrid;
- Wagner (1), ingénieur en chef au Ministère des Communications de Pologne; Varsovie;
- S. E. le Dr Sayed Abdel Wahed Bey (3), directeur général à l'Administration des Chemins de fer, Télégraphes et Téléphones de l'Etat égyptien; Le Caire;
- Dr C. C. Wang (2), representative of Chinese Ministry of Communications; 21, Tothill Street, Westminster, London, S. W. 1;
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*Honorary members* : R. da Costa Courreur, ancien président du Conseil supérieur des Travaux publics au Ministère des Travaux publics et des Communications du Portugal; Alameda das Linhas de Torres, 145, Lisbonne;

U. Lamalle, directeur général honoraire de la Société Nationale des Chemins de fer belges, professeur de cours de chemins de fer à l'Université de Louvain; 175, avenue Winston Churchill, Uccle-Bruxelles.

(1) Retires at the 16th session.

(2) Retires at the 17th session.

(3) Retires at the 18th session.

**SECRETARY'S OFFICE : 19, rue du Beau Site, Brussels.**

*General Secretary* : P. Ghilain (already named).

# RECEPTIONS, VISITS AND EXCURSIONS.

Thanks to the initiative of the Italian Executive Committee, the Delegates to the Rome Congress were able to attend various receptions and take part in numerous visits and excursions during their stay in Italy.

## I. Half-day excursions.

Each afternoon of the 26th, 27th and 29th September and 4th October, organised excursions were arranged by car in Rome and the following places: Tivoli, Anzio, Ostia and the Castelli Romani.

(a) The *tour of Rome* enabled visitors to admire the most noteworthy historical monuments of the capital, in particular the Basilica of St. Peter, St. Angelo castle, the Coliseum, the Arch of Constantine and the Forum.

After a visit to the Olympic stadium, the cars took the delegates to Mont Mario where a superb panoramic view of the whole city can be enjoyed.

This agreeable and instructive tour ended with tea at the Villa Borghesia.

(b) The *excursion to Ostia* first went to see the celebrated ruins, some 20 km from the capital. These imposing remains still give a very clear idea of what was like this wealthy port from which Rome was provisioned during the time of the Roman Empire. Amongst the works of art to be seen in these ruins, mention may be made of the mosaics in the Baths, the Theatre, the Guild place, the Temple of Rome and Augustus and the Forum.

Towards 5 o'clock, the cars took Delegates to the Lido with its impressive bathing installations. Tea was then served in a modern restaurant near the beach.

(c) The *excursion to Tivoli* enabled Delegates to admire the beauties of the Roman countryside. After climbing a zig-zag road bordered by ancient olive trees with twisted, hollow trunks, the small town of Tivoli, some 40 km from the capital, was reached.

Delegates were able to visit the Villa d'Este, built in the XVIth Century by Cardinal d'Este on a jutting spur of the mountain. The various rooms with their richly

decorated walls and ceilings lead to a terrace from which the cupola of St. Peter's Basilica in Rome can be seen on the horizon. At the foot of the terrace, the beautiful gardens descend in many slopes with their famous waterfalls and gigantic cypress trees.

After this visit, the cars took the participants to the Sybilene temple and waterfalls nearby. Tea was then served before the return run to Rome.

(d) The *tour of the Castelli Romani* was a wonderful excursion to the small villas perched on the summit of the hills to the south west of Rome. Leaving the capital by the Via Appia, the Delegates were able to admire the catacombs and remains of the tombs of famous Roman families of other days, in particular that of Cecilia Metella.

Going by the Castelgandolfo road, the cars followed the beautiful lake side road from which the full beauty of the Lakes of Albano and Nemi can be seen, formed in ancient craters. This road took the excursionists to the top of Monte Cavo from which they enjoyed a marvellous panoramic view of all the countryside.

There they were served with tea and Frascati wine. Continuing their tour, they admired Rocca di Papa, situated on the side of Monte Cavo and stopped at Frascati celebrated for its delicious wine. They then returned to Rome by the Via Tuscolana.

(e) The Delegates were also conducted to Anzio, a small town 60 km from Rome.

Anzio is the birthplace of Nero. He had a holiday villa there, some traces of which still are visible. Nero built the harbour of Anzio. This harbour was rebuilt in the XVIIth Century and is still in constant use by fishermen.

After visiting the town, members of the Congress were taken to the terraces of a restaurant where they had tea.

From these terraces, they were able to admire the vast panorama of Monts Ansoni, Lepini and Albana, and Nettuno, a small seaside town adjoining Anzio.

\* \* \*



Official banquet given by the Italian State Railways.  
General view.



## II. Technical Visits.

During the afternoons of the 26th, 27th and 29th September, and 4th October, technical visits were organised to the following plants: *Terni Company Foundry and Steelworks, Pirelli Factories, Galileo Hydro-electric Plant, the electric substation at Prenestina and the signalling installations of Rome terminus.*

On each of these visits, Delegates had 2 to 3 hours to go over the installations under the guidance of the technical staff attached thereto.

Each of these visits made it possible to show them the remarkable achievements obtained in the different industrial fields and give them some idea of the imposing part played by Italian industry in the reconstruction effort ever since the end of hostilities.

Most of these visits ended around lavish buffets.

\* \* \*

## III. Various Receptions.

### (a) Reception of Delegates at the Capitol.

On Monday September 25th at midday, Delegates and their wives were invited to a reception by the Mayor of Rome in the Conservators Palace at the Capitol.

Very warm welcoming speeches were made by the Minister of Transport and the Mayor of Rome to the members of the Congress collected together in the Horaces and Curiaces Room.

After M. DELORY, President of the International Railway Congress Association, had thanked the Italian Authorities for the great welcome given to the Congress, Delegates visited the museum and gardens of the Palace where there were many buffets for their entertainment.

The reception ended about 2 p.m.

### (b) Official banquet.

On Thursday 28th September at 8.30 p.m., Delegates and their families were invited to an official banquet by the Italian Authorities in the Felix Palace on the Foro Italico.

The rooms were richly decorated and the tables covered with flowers.

The banquet was presided over by M. D'ARAGONA, Minister of Transport, who had on his right M. DELORY, President of the International Railway Congress Association, and on his left M. DI RAIMONDO, General Manager of the Italian State Railways and President of the Rome Session.

During the banquet an excellent orchestra played a programme of music which contributed to the general festivity of the occasion.

During dessert, speeches were made by M. D'ARAGONA on behalf of the Government, by M. DI RAIMONDO on behalf of the Italian Executive Committee, and by M. DELORY on behalf of the members of the Congress.

At the end of the banquet, the members of the Congress were entertained upstairs by a display of folk songs and dancing given by various groups of actors and singers dressed in their regional costumes. These artistes, who belong to the Ente Nazionale d'Assistenza Lavoratori had a great success and were loudly applauded.

The evening then ended with a ball in which all the guests took part, which lasted till 2 in the morning.

### (c) Audience with the Pope.

On Tuesday the 3rd October, members of the Congress were taken by car to Castelgandolfo, where they were received in special audience by His Holiness Pope Pius XII, in one of the upstairs rooms of his summer residence.

The Holy Father addressing them in French paid a tribute to the railways and their efforts to restore the national economy of each country. He also stressed the interest of the questions being discussed at the Congress, particularly the social questions. He underlined the happy results that can be achieved in the railway sphere when problems are discussed on the international level.

His discourse was warmly applauded.

After giving his apostolic blessing, the Holy Father spoke to several of the Delegates.

\* \* \*

## IV. Two day excursion given by the Italian Railways.

Two excursions were offered by the Italian Railways to members of the Congress,

on the 30th September and 1st October, so that they could choose that which most appealed to them.

These excursions were organised to show the most famous parts of Italy under ideal travelling conditions.

Everything was done to show them as much as possible in the very limited time available.

We give below a brief review of each of these excursions.

#### 1. EXCURSION A.

##### *Naples-Pompeii-Capri.*

This excursion started on Saturday 30th September at 7.30 a.m. A special train from Rome Terminus took Delegates to Naples where cars were put at their disposal to take them through the picturesque quarters of the town; they then went to the high promontory of Pausilippe, where there is a superb panorama of the Bay of Pouzzoles. Returning to the town, they had many views of the Bay of Naples dominated by the imposing silhouette of Vesuvius.

After lunch, they went by cars to Pompeii, where guides took them round the celebrated ruins. Towards 5.30 they returned to Naples where the Mayor of the town gave a reception in their honour in the old Palais Royal. At 9 p.m. they dined in the rooms of the Casino. During dessert, they were entertained by neapolitan songs and folk dances in regional costumes, which were warmly applauded.

This very agreeable evening ended at 1 o'clock in the morning.

The next day, Sunday October 1st, the Delegates embarked at 8.30 a.m. from Bevarello quay in a special boat, which after a sunny crossing, arrived about 10.30 in the Marina Grande Bay of the Isle of Capri. After a short ascent in a funicular railway, they reached the beautiful little town of Capri where they wandered about the many steep and picturesque little streets.

After an excellent lunch served in the best hotels, they were able to explore the town or walk towards Anacapri and the Villa San Michele, or toward the south part of the island where there is an unforgettable view of the famous Faraglione Rocks.

At 5.30 p.m. they returned to the boat and after a somewhat rough crossing reached Naples at 9 p.m.

A special train awaited them upon disembarkation. An excellent picnic meal was distributed before the train left to take the Delegates back to Rome, arriving about half an hour after midnight when cars were waiting to take them back to their different hotels.

#### 2. EXCURSION B.

##### *Florence.*

This excursion started on Saturday 30th September. A special train leaving Rome Terminus at 7.30 for Florence ran through the beautiful Umbrian and Tuscan plains.

On arriving at Florence at 11.30 Delegates were taken to their hotels and had lunch.

In the afternoon they toured the city by car, and stopped at the Palais Vecchio, the ancient dwelling of the Medicis, where they were welcomed by the local authorities and given tea. They were then able to admire the magnificent Cinquecento room, the collection of ancient maps and museum of paintings.

In the evening they all attended an excellent dinner at one of the best hotels in the town; at 9 p.m. they were able to enjoy an organ recital in the beautiful Gothic church of St. Cross celebrated both for its organ and for the famous men who are buried there : Galileo, Minchael-Angelo, Machiavelli and Alfieri. There are some wonderful frescoes by Giotto in one of the side chapels.

After this, cars took the participants back to their hotels around midnight.

The next day, Sunday October 1st, in the morning a visit was paid to the gothic cathedral with its marble facade and cupola, which we owe to the genius of Brunelleschia, as well as the famous XIVth Century campanile.

Opposite is the Baptistry of St. John, octagonal in shape, with doors finely executed in bronze.

Cars then took the Delegates to the Convent of San Marco and the Pitti Palace, whose picture gallery is justly accounted one of the most famous in the world. It contains many paintings by Raphael, Titian, Tin-

toretto, Paul Veronese, Perugino and Botticelli.

They then went on to the Place Michael Angelo on the left bank of the River Arno, where there is a very pretty view of Florence and the adjoining hills.

After lunching at their hotels, members of the Congress were taken by cars to Fiesole, where they could admire a magnificent panoramic view of Florence.

Towards 5.30 p.m., they returned to their hotels and then went to the station to take the train back to Rome. A delicious picnic meal issued before the train left enabled them to have a comfortable supper on the train, which arrived in Rome towards 11 p.m. when they were taken by cars to their hotels.

\* \* \*

#### V. Excursions of several days.

At the end of the Congress, those Delegates who wished to prolong their visit to Italy were able to join one or other of the different excursions organised by the Italian Tourist Company to the most famous and most characteristic parts of Italy. These excursions enabled Delegates to make very varied and picturesque journeys under the most comfortable conditions, with the services of excellent guides.

We give below a list of the routes taken by these different excursions.

##### 1. Umbria and Tuscany.

Thursday 5th October: Leave Rome for Assise. — Visit the town. — Stay at Perugia.

Friday 6th October: Visit Perugia. — Stay at Florence.

Saturday 7th October: Leave Florence for Sienna. — Visit the town. — Return to Florence for the night.

##### 2. Naples-Capri-Pompeii.

Thursday 5th October: Leave Rome for Naples. — Visit the town and spend the night there.

Friday 6th October: Leave by boat for Capri and visit the island. — Go by boat from Capri to Sorrente. — Stay at Sorrente.

Saturday 7th October: Go by car from Sor-

rente to Naples via Amalfi and Ravello. — Stay at Naples.

Sunday 8th October: Visit Pompeii and Naples. — Return to Rome in the evening.

##### 3. Bay of Tigullio and Ligurian Riviera.

Thursday 5th October: Leave Rome for Pisa. — Visit the town and spend the night there.

Friday 6th October: Leave Pisa for Viareggio. — Visit the town. — Stay at Rapallo.

Saturday 7th October: Free day in Rapallo, with excursions available to Portofino and Sta. Margherita.

Sunday 8th October: Free day in Rapallo.

Monday 9th October: Leave Rapallo for Genoa and San Remo.

##### 4. Sicily.

Thursday 5th October: Leave Rome for Palermo (either by train or by boat from Naples).

Friday 6th October: Visit Palermo. — Stay the night there.

Saturday 7th October: Leave Palermo for Syracuse and stay the night there.

Sunday 8th October: Visit Syracuse and leave for Taormina to stay the night there.

Monday 9th October: Excursion by car to Mount Etna. — Stay at Taormina.

Tuesday 10th October: Leave Taormina for Rome.

##### 5. Florence-Venice-Milan-Lake Coma.

Thursday 5th October: Leave Rome for Florence. — Free afternoon. — Stay the night in Florence.

Friday 6th October: Visit Florence and excursion to Fiesole. — Stay the night in Florence.

Saturday 7th October: Free morning. — Leave Florence to Venice and stay the night there.

Sunday 8th October: Visit Venice on foot and by gondola.

Monday 9th October: Leave Venice for Milan. — Stay in Milan.

Tuesday 10th October: Excursion to Lake Coma and return to Milan.

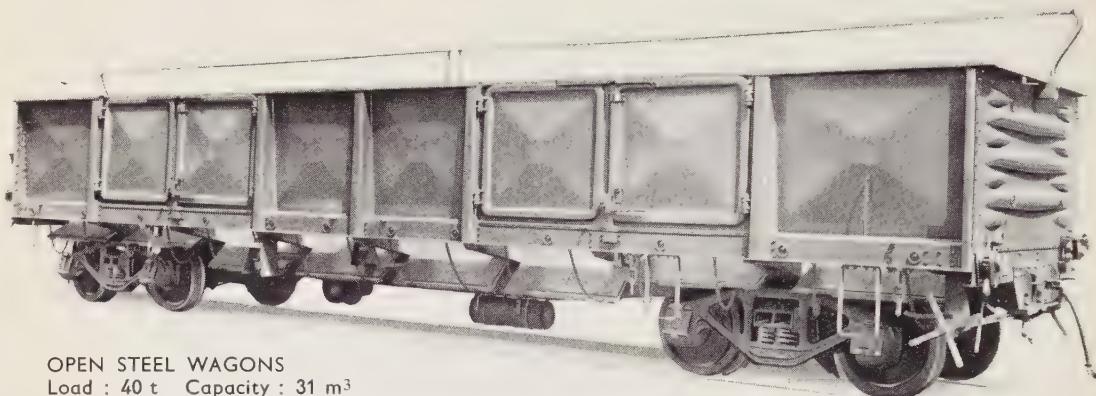


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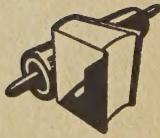
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